

The taxonomic revision of *Alcea* and *Althaea* (Malvaceae) in Turkey

Mehmet Erkan UZUNHİSARCIKLİ*, Mecit VURAL

Department of Biology, Faculty of Science, Gazi University, 06500, Teknikokullar, Ankara - TURKEY

Received: 10.08.2011 • Accepted: 05.06.2012

Abstract: *Alcea* L. is represented by 18 species and *Althaea* L. by 4 species in the *Flora of Turkey*. Seventeen species of *Alcea* and all species of *Althaea* were collected. One new cultivated record of *Alcea* was added. Contrary to the *Flora of Turkey*, the endemism of *Alcea apterocarpa* (Fenzl) Boiss., *Alcea calvertii* (Boiss.) Boiss., and *Alcea fasciculiflora* Zohary has not been proved. The threat category of *Alcea fasciculiflora* and *Alcea pisidica* Hub.-Mor. has been changed to CR, while they were placed in DD according to the *Red Data Book of Turkish Plants*. As a result of this study, determination keys, detailed descriptions, and illustrations of *Alcea* and *Althaea* species are presented. Phytogeographical regions of all taxa are suggested.

Key words: Revision, *Alcea*, *Althaea*, Malvaceae, Turkey

Introduction

Alcea L. and *Althaea* L. are taxonomically assigned to Malvaceae subfam. Malvoideae, tribe Malveae. As a result of the limited time and resources during the preparation of the *Flora of Turkey*, many taxonomical problems in some genera and sections were only mentioned but not solved. The editors suggested that further revisions should be carried out to solve these problems (Davis & Hedge, 1975). *Alcea* and *Althaea* are examples of those with many unresolved taxonomical problems. Several recent revisions on different groups of flowering plants have presented significant taxonomic solutions within problematic groups (Parmaksız & Özcan, 2011; Tekşen & Aytaç, 2011).

In terms of taxonomic history, first Tournefort and then Linnaeus in *Species Plantarum* (1753) indicated that *Alcea* and *Althaea* are 2 separate genera attributed to Malvaceae. In the subsequent studies Willdenow (1800) and Baker (1890) combined these

genera into one genus, *Althaea*; probably this fusion occurred because of very little material. In some studies, such as Alefeld (1862), Boissier (1867), and Iljin (1949), these genera were distinctly separated in regard to characteristic features of carpels and anthers. The later treatment is still followed.

Malvaceae includes 80 genera and about 1000 species around the world. South America can be considered the region where this family is widest spread. They are distributed throughout the world except the cold regions. *Alcea* is represented worldwide by about 70 species and *Althaea* by nearly 12 (Zohary, 1963; Hutchinson, 1973; Heywood, 1978). *Althaea* and *Alcea* show overlap through the Mediterranean and Iran-Turanian phytogeographical regions. Both these genera are distributed throughout Europe (except the north part), North America, North Africa, Caucasus and southern Russia, and from Anatolia to Afghanistan (Hutchinson, 1964; Cullen, 1967; Heywood, 1978; Nasır & Ali, 1979).

* E-mail: merkan@gazi.edu.tr

Alcea shows the highest counts of species in Iran, Russia, and Turkey, in descending order. The order is changed about for *Althaea* as Russia, Iran, and Turkey (Iljin, 1949; Riedl, 1969; Townsend, 1974; Nasir & Ali, 1979).

A palynological study showed that the pollen of *Alcea* is spheroidal, pantoporate, echinate, and baculate. The pollen grains of *Althaea* are spheroidal, pantoporate, and echinate, which is characterised by having a subglobose pattern at the base of echinae. Distances between pori are longer in *Althaea* (9.04-12.75 µm) pollen than in pollen of *Alcea* (5.12-7.28 µm). The results confirmed that differences in pollen characteristics among the taxa are not useful in separating taxa at specific level, especially in *Alcea*, whereas there are clear differences based on pollen morphology between 2 closely related genera (Cabi et al., 2009).

In *Alcea*, based on obtained results, the diploid chromosome number is 42. *Alcea rosea* has a diploid chromosome number of 84 (Vachova & Majovsky, 1980; Chariat-Panahi et al., 1982; Markova, 1982, 1989; Markova & Goranova, 1993; Murín, 1993; Dobeá & Hahn, 1997). There are various chromosome numbers in *Althaea*; for instance, the diploid chromosome number in *A. cannabina* is 84. *Althaea hirsuta* and *A. officinalis* indicate 2 kinds of chromosome number, 50/41+3B and 40/42, respectively (Strid & Franzen, 1981; Markova, 1982; Amadei et al., 1983; Markova & Goranova, 1993).

The flowers of *Alcea* and *Althaea* have medicinal usages due to abundant mucilage. *Althaea officinalis* L. is used for treating throat pains, stomach aches, colds, coughs, and asthma (Rouhi & Ganji, 2007) and *Alcea biennis* Winterl for coughs in colds (Yücel, 2000). Leaves and flowers of *Alcea setosa* (Boiss.) Alef. are used for treating stomach pain, inflammation, and asthma (Azaizeh et al., 2007). Moreover, *Gossypium* L. and *Hibiscus* L. are used as ornamental and gardening plants (e.g., *Alcea rosea* L.).

Materials and methods

Research materials of *Alcea* and *Althaea* were collected from different parts of Turkey in April-September, both in the flowering and fruit bearing periods of 2003-2007. In order to study the variation patterns, specimens were collected from as many different parts of the existing section of the distribution area.

In addition, the collections in AEF, ANK, GAZI, Hb. Linn., HUB, ISTE, ISTE, EGE, KNYA, K, E, BM, G, and MSB herbaria were examined. The author name of every species was written according to *Authors of Plant Names* (Brummitt & Powell, 2001).

A range of characteristic features considered to be taxonomically important in the genus was investigated. These include indumentum of the whole plant, division and measurements of leaf, ratio of epicalyx to calyx, pedicel length, colour and length of corolla, and mericarp. Each character was measured on at least 20 specimens of each species and the results were used in the descriptions.

Diagnostic key to genera

- 1- Carpels sub-bilocular; anthers yellowish ... *Alcea*
- 1- Carpels unilocular; anthers purple or brownish purple..... *Althaea*

Taxonomic treatment of *Alcea*

Mostly erect annual, biennial, or perennial. Stem erect and branched from the base or acaulescent, sparsely to densely stellate, pilose, setose-hispid, hirsute, fasciculate hairy, or glabrous. Leaves entire-palmatisect, orbicular, lanceolate, cordate, cuneate, truncate at the base, margin crenate-serrate, apex obtuse, acuminate, sparsely to densely stellate hairy; 3-9 lobes, oblong-ob lanceolate, lobes ± equal, rarely the middle lobe larger than others, sometimes lobes inconspicuous. Stipule entire or 2-5-fid, sometimes caducous or absent, sparsely to densely stellate-pilose hairy. Inflorescence raceme, 1-5 flowered fascicles in leaf axils. Epicalyx 4-9, connate at the base, stellate hairy. Epicalyx more or less than ½ as long as calyx. Sepals 5, connate at the base, slightly or conspicuously striate, lanceolate, margin entire, apex obtuse, acuminate, densely stellate-pilose hairy. Petals 5, white, pink-violet, yellow, margin entire, apex entire or conspicuously emarginate, junctions at the base densely white pilose hairy. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical-angular, glabrous. Stylus ± conspicuously divided toward the apex, surrounded by stamens. Mericarps reniform-orbicular, straw-brown, wingless or winged, ± conspicuously rugose, ± conspicuously furrowed, stellate-pilose hairy or glabrous on dorsal side, hairy or glabrous on lateral side. Seeds reniform, brown, surface ± clearly tuberculate, around hilum white pilose hairy or glabrous.

Key to the species of *Alcea*

- 1- Cultivated plants ^{1*}**rosea**
- 1- Wild plants
 - 2- Plant acaulescent or rarely caulescent, stem 2-10 cm **1. acaulis**
 - 2- Plant caulescent, stem up to 2.5 m, sometimes branched at the base
 - 3- Ripe mericarps conspicuously winged
 - 4- Epicalyx less than ½ as long as calyx
 - 5- Basal leaves palmatifid-palmatisect
 - 6- Stipule simple or 2-fid
 - 7- Plant glabrous, rarely very sparsely simple hairy; petals pink **17. fasciculiflora**
 - 7- Plant densely stellate-pilose hairy; petals white-canary **15. excubita**
 - 6- Stipule 3-5-fid **14. dissecta**
 - 5- Basal leaves entire-palmatilobate
 - 8- Stem glabrous, rarely very sparsely stellate hairy
 - 9- Petiole of basal leaves 3-10 cm; the sides of the mericarp stellate hairy.. **7. kurdica**
 - 9- Petiole of basal leaves 10-20 cm; the sides of the mericarp pilose..... **16. flavovirens**
 - 8- Stem densely stellate hairy
 - 10- Pedicels up to 5 mm; the flowers in raceme are contracted towards the apex **8. heldreichii**
 - 10- Pedicels 6-35 mm; the flowers in elongated raceme **9. calvertii**
 - 4- Epicalyx more than ½ as long as calyx, sometimes equal
 - 11- Petals yellow
 - 12- Floral leaves palmatilobate-palmatifid; petiole of cauline leaves up to 25 cm; 1-5 flowered fascicles; seed surface entire **10. hohenackeri**
 - 12- Floral leaves entire-palmatilobate; petiole of cauline leaves up to 9 cm;
 - 1-3 flowered fascicles; seed surface tuberculate
 - 13- Plant at most 70 cm; leaves conspicuously thick; margin serrate **2. guestii**
 - 13- Plant up to 250 cm; leaves not thick; margin crenate **11. pisidica**
 - 11- Petals white, lilac, pink, violet **13. biennis**
 - 3- Ripe mericarps wingless
 - 14- Epicalyx less than ½ as long as calyx
 - 15- Leaves 5-7 lobed; the middle lobe conspicuously larger than others; mericarps conspicuously rugose **3. remotiflora**
 - 15- Mericarps not rugose; leaves 3-7 lobed, lobes ± equal **2. striata**
 - 14- Epicalyx more than ½ as long as calyx, sometimes ½ as long as calyx
 - 16- Stem sparsely-densely stellate hairy or glabrous; leaves palmatipartite-palmatisect; mericarps pilose hairy **4. digitata**
 - 16- Stem sparsely-densely stellate, setose-hispid, hirsute, pilose, fasciculate hairy; leaves entire-palmatipartite; mericarps stellate-pilose hairy
 - 17- Stem setose-hispid, pilose, stellate hairy; cauline leaves 5 lobed; petals not exceeding 4.5 cm **5. setosa**
 - 17- Stem sparsely-densely stellate, hirsute, fasciculate hairy; cauline leaves 5-9 lobed; petals to 6.5 cm **6. apterocarpa**

¹ This species has been considered a cultivated taxon and marked with an asterisk (*).

1. *Alcea acaulis* (Cav.) Alef., Oesterr. Bot. Z. 12: 251 (1862). (Figure 1).

= *Althaea acaulis* Cav., Diss. 2: t. 27 (1786).

Lectotype: figured by A.J.Cavanilles in 1786. (Diss. 2: t. 27!).

Perennial, acaulescent or caulescent. Stem 2-10 cm long, 2-4 mm diam., cylindrical or slightly angular, densely stellate hairy. All leaves palmatilobate, orbicular-reniform, 1-5 × 1-6 cm, cuneate or cordate at the base, margin crenate, apex obtuse, stellate hairy; lobes inconspicuously. Petiole 1.5-18 cm, sparsely stellate hairy. Stipule simple or 2-fid, 1.5-5 mm, lanceolate, margin entire, apex acuminate, stellate-pilose hairy. Flowers at the base or rarely in the leaf axils. Pedicels 0.5-4 cm, stellate hairy. Epicalyx 5-7, connate at the base, 2-5 × 1-4 mm, lanceolate, margin entire, apex acuminate, stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, slightly striate, 10-20 × 2-5 mm, lanceolate, margin entire, apex acuminate, stellate hairy. Petals 5, white or pink, 1.4-4 × 0.4-1.2 cm, margin entire, apex entire or slightly emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube

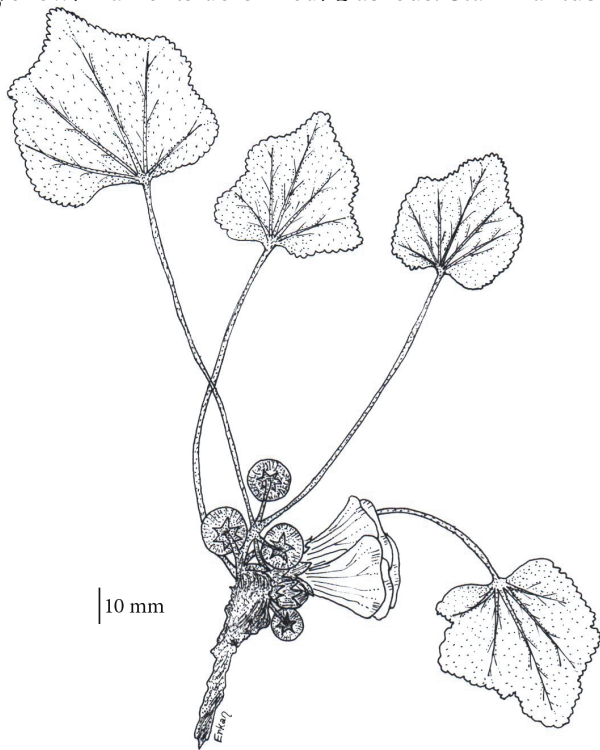


Figure 1. Habitus of *Alcea acaulis*.

2-5 mm, glabrous. Stylus divided toward the apex. Mericarps 4-5 × 4-5 mm, reniform-orbicular, brown, wingless, conspicuously rugose, glabrous. Seeds 2-2.5 × 2.5-3 mm, reniform, brown, tuberculate, sparsely white pilose hairy around hilum.

Fl. 4-5, Fr. 5-6, Habitat: steppe, fields, roadsides, 400-450 m.

Examined specimens: Turkey, C6 Gaziantep: Nizip-Karakamış, vineyards, 25.05.1986, İ.Aslanyürek (ANK); Urfa: Nizip-Barak, 450 m, 21.04.1986, fields, T.Baytop s.n. (ISTE 56874); Nizip-Osmaniye, 300 m, 08.05.2007, roadsides, E.Uzunhisarcıklı 2224 (GAZI); C7 Urfa: Urfa-Akçakale, 29 km, 400 m, 13.06.2004, fields, 36°51'48"N 38°55'24"E, E.Uzunhisarcıklı 1958 (GAZI); Urfa-Akçakale, 32 km from Urfa, 450 m, fallow fields, 17.05.1957, P.H.Davis 28157 (K).

Distribution: Turkey, Palestine, Egypt, Syria. Irano-Turanian element.

Alcea acaulis, by its significant characteristic feature, acaulescent habitus or very short stem, is distinguishable from other species. *Alcea acaulis* has been determined to be in the CR category (by IUCN) within Turkey. Moreover, a type specimen has been introduced for this species when previously there was none. Among previous studies on *Alcea* (Cavanilles, 1786; Alefeld, 1862; Zohary, 1963), an illustration has been found within *Monadelphiae Classis Dissertationes Decem* (Cavanilles, 1786) belonging to *Alcea acaulis*, which is assigned as the lectotype when there was no information about its locality in the book. This illustration has been used as the lectotype.

2. *Alcea striata* (DC.) Alef., Oesterr. Bot. Z. 12: 252 (1862).

= *Althaea striata* DC., Prodr. 1: 437 (1824).

Perennial, plant 20-110 cm, erect, branched at the base. Stem 1.5-10 mm diam., cylindrical, densely stellate hairy. Leaves entire-palmatilobate, cordate-orbicular, truncate at the base, margin crenate, serrate, apex obtuse, acuminate, stellate hairy; 3-5-lobed or not. Basal leaves 2-10 × 3-12 cm. Petiole 3-12 cm, stellate hairy. Stipule absent or 3-fid, 2-4 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate-pilose hairy. Cauline leaves 1.5-10 × 2-12 cm. Petiole 2-18 cm, stellate hairy. Stipule absent or 3-fid, 2-5 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate-pilose hairy. Floral leaves 0.8-8

× 1-10 cm. Petiole 0.5-15 cm, stellate hairy. Stipule absent or 3-fid, 1.5-4 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate-pilose hairy. Inflorescence raceme, 1-3 flowered fascicles in the leaf axils. Pedicels 2-30 mm, stellate hairy. Epicalyx 6-7, connate at the base; lobes 2-6 × 1.5-5 mm, lanceolate, margin entire, apex acuminate, obtuse, stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, conspicuously striate, 10-20 × 4-8 mm, lanceolate, margin entire, apex obtuse, acuminate, stellate hairy. Petals 5, white, pink or yellow, 2-5 × 0.8-3 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 0.5-3 mm, glabrous. Stylus divided toward the apex. Mericarps 3-4 × 3-5 mm, orbicular, straw-brown, wingless, stellate hairy, lateral surface pilose hairy. Seeds 1-2 × 1.5-3 mm, reniform, brown, glabrous or slightly tuberculate, pilose hairy around hilum.

subsp. *striata* (Figure 2).

= *Alcea haussknechtii* Boiss., Fl. Orient. 1: 830 (1867).

Type: Described from a specimen cultivated in the Hortus Celsius (G).

Fl. 5-7, Fr. 6-8, Habitat: rocky limestone slopes, fields, roadsides, scrub, s.l.-1200 m.

Examined specimens: Turkey, C3 Antalya: Manavgat to Akseki, 31 miles from main road junction, 475 m, 14.06.1962, limestone cliffs, *P.H.Davis* 35786 (E); Alanya: Alarahan, 700 m, 20.06.1972, *Davidson* 6565 (K); Antalya, Çarma D., 300 ft. 17.06.1958, *P.B.Smith* 16 (K); Antalya-Isparta, 55 km, 200 m, 06.07.2005, roadsides, *E.Uzunhisarcıklı* 2039 (GAZI); C5 Adana: distr. Feke: Sencan Dere between Gurumze and Suphan Dere, 1000 m, 01.07.1952, flowers pink, *P.H.Davis* 19625 (ANK, K, E); Saimbeyli-Feke, 27 km to Feke, 800 m, 08.07.2005, roadsides, *E.Uzunhisarcıklı* 2068 (GAZI); Adana-Mersin, 20 m, 07.07.2005, roadsides, *E.Uzunhisarcıklı* 2053 (GAZI); Karsantı- Şamadan *Quercus* society, 1020 m, 15.07.1972, *E.Yurdakulol* 109 (ANK); C7 Urfa: 56 km from Birecik, fields, 20.05.1956, *H.Birand* 63 (ANK); C8 Mardin: Mardin-Nusaybin, 5-10 km from Nusaybin, 600 m, 22.05.1957,

P.H.Davis & *I.Hedge* 28410 (ANK, E, K); C9 Hakkari: Çukurca, 1200 m, 12.06.1966, rocky limestone slopes in *Quercus aegylops* scrub, *P.H.Davis* 44759 (K, E).

Distribution: Turkey, Palestine, Egypt, Syria. Irano-Turanian element.

subsp. *rufescens* (Boiss.) Cullen, Notes Roy. Bot. Gard. Edinburgh 27: 216 (1967). (Figure 3).

= *Althaea rufescens* Boiss., Diagn. Pl. Orient., ser. 2 (1): 102 (1853).

= *Alcea rufescens* (Boiss.) Boiss., Fl. Orient. 1: 828 (1867).

Lectotype: Syria, Aleppo, inter segetes, 1841, *Kotschy* 218 (W).

Fl. 6, Fr. 6-7, Habitat: roadsides, 30-2200 m.

Examined specimens: Turkey, B7 Malatya:

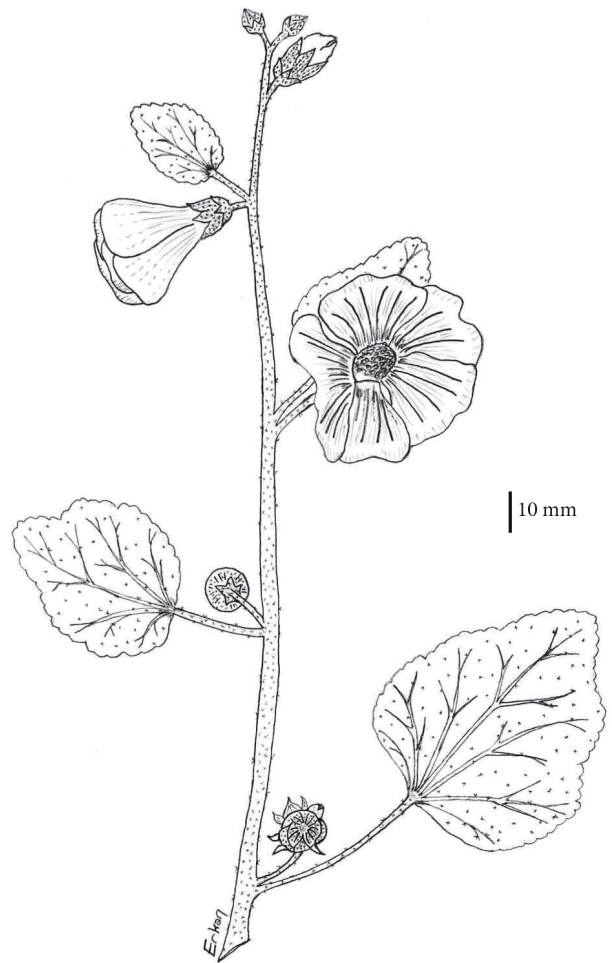


Figure 2. Habitus of *Alcea striata* subsp. *striata*.



Figure 3. Habitus of *Alcea striata* subsp. *rufescens*.

Malatya-Pötürge, 2 km, 1245 m, 11.07.2005, roadsides, *E. Uzunhisarcıklı* 2084 (GAZI); B9 Van: Çatak, 100. Yıl Parkı, ca. 2200 m, 28.06.1986, *Ö. Seçmen* 33174 (EGE).

Distribution: Turkey, Egypt, Syria. Irano-Turanian element.

Alcea striata subsp. *striata* is separated by unlobed or shallowly lobed leaves, while in subsp. *rufescens* leaves are clearly 3-5-lobed. There is no specimen with intermediate characters between these taxa, and so they are distinctively determined.

3. *Alcea remotiflora* (Boiss. & Heldr.) Alef., Oesterr. Bot. Z. 12: 253 (1862). (Figure 4).

= *Althaea remotiflora* Boiss. & Heldr., Diagn. Pl. Orient. 1 (8): 108 (1849).

Type: [Turkey C3 Antalya] Adalia, in campis maris finitimus, 07.1845, *Heldreich s.n.* (E!).

Perennial, plant 25-80 cm, erect, branched at

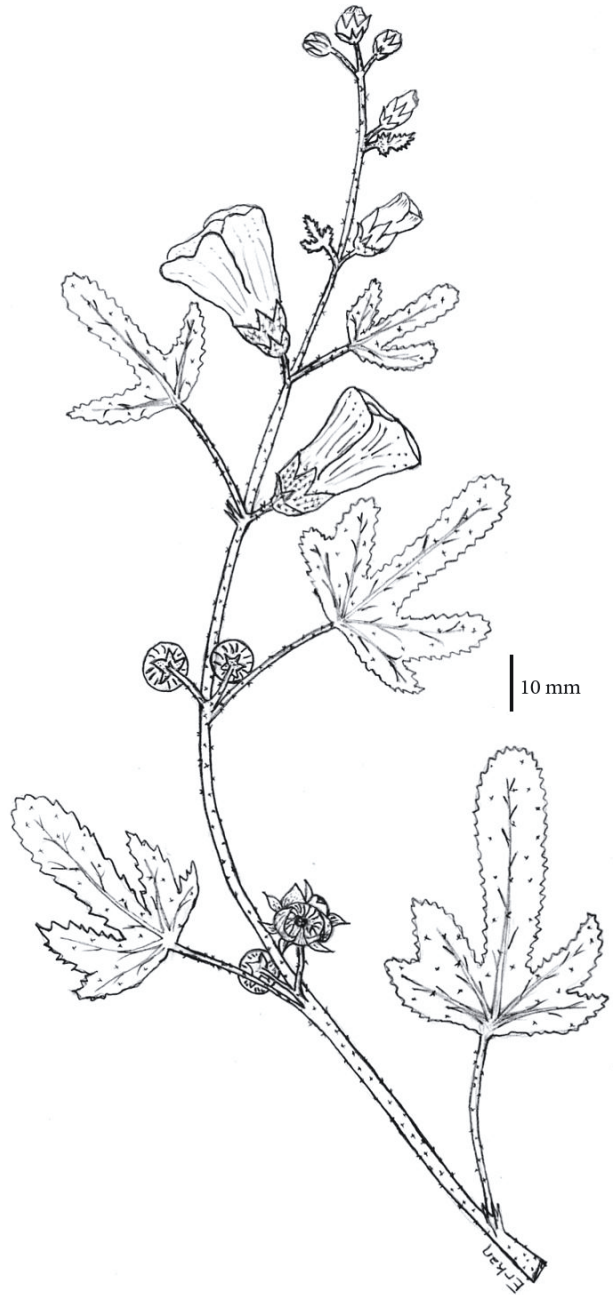


Figure 4. Habitus of *Alcea remotiflora*.

the base. Stem 1-10 mm diam., cylindrical, densely stellate hairy. Leaves palmatilobate-palmatipartite; 5-7-lobed, the middle lobe conspicuously larger than others, upper surface sparsely, lower surface densely stellate-pilose hairy. Basal leaves 2-7 × 2-10 cm, orbicular, cuneate-truncate at the base, margin crenate, apex obtuse; inconspicuously lobed. Petiole 3-9 cm, stellate hairy. Stipule absent or 2-fid, 1.5-

2.5 mm; lobes linear-lanceolate, margin entire, apex obtuse, densely stellate hairy. Cauline leaves 1.5-8 × 1-10 cm, orbicular, cordate, truncate at the base, margin crenate, apex obtuse; lobes 0.5-4 × 0.5-4.5 cm, oblong-ob lanceolate. Petiole 1-10 cm, stellate hairy. Stipule simple or 3-4-fid, 1-7 mm; lobes linear-lanceolate, margin entire, apex acuminate or obtuse, stellate hairy. Floral leaves 1-6 × 1-5 cm, orbicular, lanceolate, truncate at the base, margin crenate, apex obtuse; lobes 0.2-4 × 0.2-1.5 cm, oblong-ob lanceolate. Petiole 0.4-4.5 cm, stellate hairy. Stipule 3-fid, 2-4 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Inflorescence raceme, 1-2 flowered fascicles in the leaf axils. Pedicels 2-10 mm, densely stellate hairy. Epicalyx 6-8, connate at the base; lobes 1-7 × 1-5 mm, lanceolate, margin entire, apex acuminate, stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, conspicuously striate, 10-15 × 3-6 mm, lanceolate, margin entire, apex obtuse, acuminate, stellate hairy. Petals 5, white, yellowish at the base, 1.5-3 × 1-2 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 1-3 mm, glabrous. Stylus divided toward the apex. Mericarps 2-4 × 2-4 mm, orbicular, brown, wingless, shallowly furrowed, conspicuously rugose, furrowed, pilose hairy on lateral side. Seeds 1.5-2 × 2-3 mm, reniform, brown, slightly tuberculate, sparsely pilose hairy around hilum.

Fl. 6-7, Fr. 7-8, Habitat: roadsides, calcareous, maquis, 20-1800 m.

Examined specimens: Turkey, C2 Muğla: Marmaris, Sakar, ca. 400 m, 01.07.1979, Ö.Seçmen 2114 (HUB); C3 Antalya: Lara, 04.08.1965, N. & M.Tanker s.n. (ISTE 8245); Perge, 20 m, 08.07.2004, roadsides, E.Uzunhisarcıklı 1989 (GAZI); ibid., 06.07.2005, E.Uzunhisarcıklı 2044 (GAZI); Antalya-Isparta, 35 km, 160 m, 06.07.2005, roadsides, E.Uzunhisarcıklı 2040 (GAZI); C5 Mersin: Veyselli-Taburili, 950 m., 22.06.1971, maquis, T.Uslu 913 (ANK); Adana: Adana-Pozantı, 2-3 km, 300-500 m, 24.06.2004, roadsides, E.Uzunhisarcıklı 1982 (GAZI); Saimbeyli-Tufanbeyli, 3 km, 1200 m, 08.07.2005, calcareous, E.Uzunhisarcıklı 2056 (GAZI).

Distribution: Turkey, Syria. E. Medit. element.

Alcea remotiflora is morphologically similar

to *Alcea striata* subsp. *striata*. It differs by having distinctly lobed leaves, a broad middle lobe, mericarps wrinkled on dorsal side.

4. *Alcea digitata* (Boiss.) Alef., Oesterr. Bot. Z. 12: 252 (1862). (Figure 5).

= *Althaea digitata* Boiss., Diagn. Pl. Orient. 1(8): 106 (1849).

= *Althaea leiocarpa* Sam. ex Rech. f, Ark. Bot. a.s. 1: 313 (1950).

Type: [Palestine] in prov. Samaria, 1846, Boissier s.n. (G!).

Perennial, plant 25-120 cm, erect branched at the base. Stem 2-12 mm diam., cylindrical, sparsely to



Figure 5. Habitus of *Alcea digitata*.

densely stellate, tomentose hairy or glabrous. Leaves palmatipartite-palmatisect, orbicular, truncate-cordate at the base, margin crenate-serrate, apex obtuse, upper surface sparsely, lower surface densely stellate, tomentose hairy; 3-7-lobed. Basal leaves 3-15 × 3-12 cm; lobes 1-10 × 0.5-1.5 cm, oblong-ob lanceolate. Petiole 2-20 cm, stellate hairy. Stipule simple or 3-fid, 1.5-3 mm; lobes lanceolate, margin entire, apex acuminate, stellate hairy. Cauline leaves 1.5-12 × 2-10 cm; lobes 0.5-12 × 0.3-1.5 cm, oblong-ob lanceolate. Petiole 1.5-15 cm, stellate hairy. Stipule 2-3-fid, 0.5-3 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy or glabrous. Floral leaves 1-10 × 1.5-12 cm; lobes 0.5-10 × 0.2-1.5 cm, oblong-ob lanceolate. Petiole 0.5-15 cm, sparsely to densely stellate hairy. Stipule 2-3-fid or absent, 1-7 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Inflorescence raceme, 1-5 flowered fascicles in the leaf axils. Pedicels 0.3-6 cm, stellate hairy. Epicalyx 6-8, connate at the base; lobes 3-10 × 1-8 mm, lanceolate, margin entire, apex acuminate, stellate hairy. Epicalyx more than ½ as long as calyx or ½ as long as calyx. Sepals 5, connate at the base, slightly striate, 10-18 × 4-9 mm, lanceolate, margin entire, apex obtuse, acuminate, densely stellate hairy. Petals 5, pink-violet, rarely white, yellowish at the base, 2.5-5 × 1-2.5 cm, margin entire, apex entire or conspicuously emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical-angular, 0.5-1.5 mm, glabrous. Stylus surrounded by the stamens. Mericarps 3-5 × 3-5.5 mm, orbicular, straw-brown, wingless, conspicuously rugose, pilose hairy, lateral side sparsely pilose hairy. Seeds 0.5-2 × 2.5-3 mm, reniform, brown, ±conspicuously tuberculate, white pilose hairy around hilum.

Fl. 5-7, Fr. 6-8, Habitat: roadsides, fields, rocky slopes, steppe, maquis, 20-2400 m.

Examined specimens: Turkey, A9 Kars: Arpaçay, Telek-Tomarlı village, 1700 m, 24.08.1984, fields, *H.Ocakverdi* 1985 (GAZI); B7 Tunceli: Ovacık, Kırkgözeler, Munzur D., 1300-1650 m, 27.07.1979, *Ş.Yıldırım* 2192 (HUB); Bitlis: Tatvan, 1750 m., 05.07.1954, *Davis* 22364 & *Polunin* (ANK); Erzincan: İliç, Hasanova road, 880 m, 13.07.1976, *T. Gözler, G.Arar* s.n. (ISTE 36360); C3 Antalya: Isparta-

Antalya, 25 km to Antalya, 125 m, 06.07.2005, roadsides, *E.Uzunhisarcıklı* 2042 (GAZI); C5 Mersin: Kuzucubelen, 18.06.1950, *A.Atilla* s.n. (ISTE 10661); Ayaş, 19.05.1969, rocky slopes, *A.Baytop, B.Çubukçu* s.n. (ISTE 15099); Adana: Çardak-Yarpuz, 300-500 m, 23.06.2004, maquis, *E.Uzunhisarcıklı* 1976 (GAZI); Mersin-Adana, 20 m, 07.07.2005, roadsides, *E.Uzunhisarcıklı* 2054 (GAZI); C6 Maraş: Engizek D., around Aksu District, 1100 m, 12.06.1987, fields, *H.Duman* 3159 (GAZI); Gaziantep: Gaziantep-Nizip, 10 km, 800 m, 09.07.2005, roadsides, *E.Uzunhisarcıklı* 2074 (GAZI); C7 Urfa: Mardin-Urfa, 45 km to Urfa, 750 m, 15.06.1984, *A. & T.Baytop* s.n. (ISTE 54377); [C10] Hakkari: Yüksekova-Dağlıca, 28 km, 2400 m, 25.07.1983, steppe, *T.Ekim* 8050 (GAZI).

Distribution: Turkey, Palestine, Syria. Irano-Turanian element.

Alcea digitata with possessing divided leaves is similar to *A. dissecta* and *A. excubita*. Other characters of *Alcea digitata* such as wingless mericarps and epicalyx more than half of calyx length make it different from *A. dissecta* and *A. excubita*.

5. *Alcea setosa* (Boiss.) Alef., Oesterr. Bot. Z. 12: 255 (1862). (Figure 6).

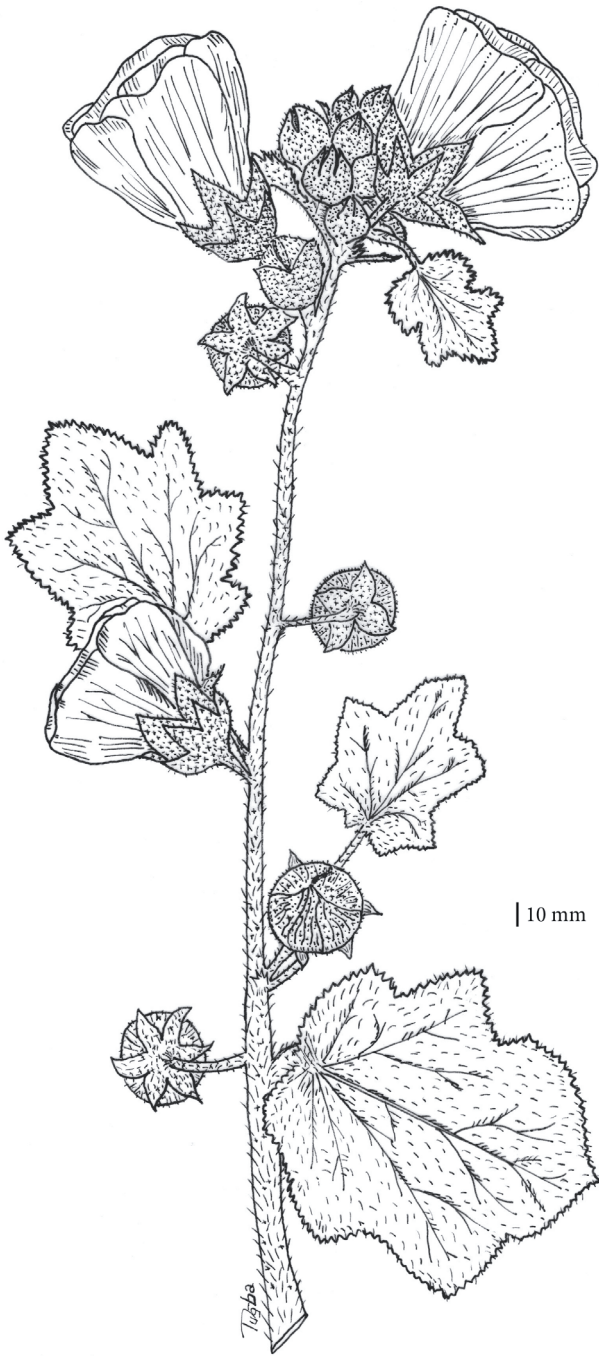
= *Althaea setosa* Boiss., Diagn. Pl. Orient. 1(8): 107 (1849).

= *Althaea pontica* Janka, Oesterr. Bot. Z. 23: 201(1873).

= *Althaea aegyptiaca* Boiss., Diagn. Pl. Orient. 2(1): 103 (1853).

Type: in collibus Palaestinae in prov. Samaria, 1846, Boissier s.n. (G!).

Perennial, plant 30-70 cm, erect, branched at the base. Plant is completely setose-hispid, pilose and stellate hairy. Stem 5-10 mm diam., cylindrical. Leaves entire-palmatipartite. Basal leaves 5-10 × 6-12 cm, orbicular, cuneate-truncate or cordate at the base, margin crenate, apex obtuse; inconspicuously lobed. Petiole 5-16 cm. Stipule 3-fid, 3-6 mm; lobes linear-lanceolate, margin entire, apex obtuse. Cauline leaves 3-10 × 3.5-10 cm, orbicular, cordate, truncate at the base, margin crenate, apex obtuse; 5-lobed, lobes 0.5-4 × 0.5-4.5 cm, oblong-ob lanceolate or inconspicuously lobed. Petiole 3-10 cm. Stipule 3-fid, 4-10 mm; lobes linear-lanceolate, margin entire, apex

Figure 6. Habitus of *Alcea setosa*.

acuminate or obtuse. Floral leaves 1-6 × 0.8-1.5 cm, orbicular, lanceolate, truncate at the base, margin crenate, apex obtuse; 3-5-lobed, lobes 0.2-3 × 0.3-1.5 cm, oblong-ob lanceolate or inconspicuously lobed. Petiole 0.2-6 cm. Stipule 4-5-fid, 4-10 mm; lobes linear-lanceolate, margin entire, apex acuminate. Inflorescence raceme, 1-3 flowered fascicles in the

leaf axils. Pedicels 0.2-4 cm. Epicalyx 6-8, connate at the base; lobes 7-16 × 3-7 mm, lanceolate, margin entire, apex acuminate. Epicalyx more than ½ as long as calyx. Sepals 5, connate at the base, conspicuously striate, 10-18 × 4-8 mm, lanceolate, margin entire, apex obtuse, acuminate. Petals 5, pink, rarely white, yellowish at the base, 2-5 × 1-2 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 2-5 mm, glabrous. Stylus divided toward the apex. Mericarps 3-7 × 2.5-6 mm, orbicular, straw, wingless, slightly furrowed, stellate-pilose on dorsal side. Seeds 1-3 × 2-5 mm, reniform, brown, slightly tuberculate, conspicuously pilose hairy around hilum.

Fl. 5-8, Fr.6-11, Habitat: roadsides, fields, wetlands, rocky slopes, calcareous, steppe, maquis, 100-1650 m.

Examined specimens: Turkey, A1 (E) Kırklareli: Kırklareli-Koçaz, 6 km from Kırklareli, 09.07.1975, wetlands, *A.Baytop s.n.* (ISTE 32451); A2 (E) İstanbul: Kanarya-Soğuksu, 02.11.1968, *A.Baytop* 14640 (HUB); Yeşilköy, 27.08.1949, *A.Baytop* 2669 (HUB); Ataköy-Yeşilyurt, 04.07.1969, *A.Baytop s.n.* (ISTE 15599); Küçükçekmece, lake side, 02.11.1968, *A.Baytop*, *B.Çubukçu s.n.* (ISTE 14656); Çatalca, 18.08.1968, *A.Baytop s.n.* (ISTE 14185); around İstanbul Pharmacy Faculty, 06.07.1970, *B.Çubukçu s.n.* (ISTE 18169); N. of Küçükçekmece lake, 17.07.1969, *A.Baytop s.n.* (ISTE 15678); Şile, 08.07.1952, *A.Baytop s.n.* (ISTE 3007); Küçükçekmece, 28.06.1987, *A.&T.Baytop s.n.* (ISTE 57990); Bakırköy, 07.1943, *M.Başarman s.n.* (ISTF 2494); Sarıyer, Rumelihisarı, 07.07.1943, *M.Başarman s.n.* (ISTF 2380); B1 Çanakkale: Gökçeada, Bademli village, ca. 100 m, 02.07.1975, *Ö.Seçmen*, *E.Leblebici s.n.* (EGE 22774); İzmir: Kemalpaşa, Nif D., Ovacık, c. 600 m, 28.06.1973, *T. Kesercioğlu s.n.* (EGE 11874); Balıkesir: Marmara adası, south side, in a dry river bed, 15.06.1968, *T.Baytop* 13622 (E); B2 Denizli: Çivril, Işıklı, Homa, 11.07.1984, *Y.Gemici s.n.* (EGE 25929); B6 Sivas: Yıldızeli, Çağlayan-Yıldızeli, *Populus tremula* forest, 1650 m., 19.07.1980, *T.Ekim* 4690 (ANK); C5 Adana: Misis D., 20.05.1969, *A.Baytop & B.Çubukçu s.n.* (ISTE 15151); Damp road, 17.05.1969, *A.Baytop & B.Çubukçu s.n.* (ISTE 15042); C6 Maraş: Engizek

D., around Aksu District, 1000 m, 11.06.1987, fields, *H.Duman* 3090 (GAZI); Hatay: Samandağ-Çevlik, rocky, 06.08.1986, *N.Topaloğlu s.n.* (ISTE 57164); Yayla D., Kışlık village, 24.05.1997, *M.Keskin s.n.* (ISTE 77993); C7 Urfa: Ceylanpınar, Gürbaba District, 550 m, 04.05.1995, steppe, *Z.Aytaç&N.Adıgüzel* 2311 (GAZI); - Mardin: Derik, Derik-Mazı D., 2 km, 810-830 m, 24.06.2001, calcareous, *H.Duman* 8592 (GAZI); Nusaybin-Mardin, 48 km, 600 m, 12.06.2004, rocky slopes, *E.Uzunhisarcıklı* 1957 (GAZI); C8 Diyarbakır: Diyarbakır-Mardin, 10 km to Mardin, 07.06.1971, *A.Baytop* (ISTE 20043); C10 Hakkari: Yüksekova, Iştasin (Yeşiltaş) village, c. 1400 m, 19.06.1975, *A.Güner* 1362 (HUB).

Distribution: Turkey, Cyprus, W Syria. Widespread.

A. setosa is closely related to *A. apterocarpa*, *A. guestii*, and *A. hohenackeri*. These species can be distinguished easily from *A. apterocarpa* by its setose-hispid hairs and from *A. guestii* and *A. hohenackeri* by its wingless mericarps.

6. *Alcea apterocarpa* (Fenzl) Boiss., Fl. Orient. 1: 830 (1867). (Figure 7).

= *Althaea apterocarpa* Fenzl, Index Seminum (WU) 4 (1858).

= *Alcea lasiocalycina* Boiss., Fl. Orient. 1: 830 (1867).

Type: [Turkey, C5 İçel] ad inclitas Güllek Boghas in regione montana, 1200 m, 1853, *Kotschy s.n.* (W!).

Perennial, plant 30-200 cm, erect, branched at the base. Stem 2.5-15 mm diam., cylindrical, sparsely to densely stellate, hirsute to fasciculate hairy. Leaves palmatilobate-palmatipartite, upper surface sparsely, lower surface densely stellate hairy. Basal leaves 3.5-15 × 4-16 cm, orbicular, cordate, truncate at the base, margin crenate, apex obtuse; 5-lobed, inconspicuously lobed. Petiole 4-18 cm, stellate hairy. Stipule absent or 3-4-fid, 2.5-6 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate-pilose hairy. Cauline leaves 3-15 × 4-17 cm, orbicular, truncate, cordate at the base, margin crenate, apex obtuse; 5-9-lobed, lobes 0.5-4 × 0.7-7 cm, oblong-ob lanceolate. Petiole 3-20 cm, stellate hairy. Stipule absent or 3-4-fid, 2-10 mm; lobes linear-lanceolate, margin entire, apex acuminate or obtuse, densely stellate-pilose hairy. Floral leaves 0.8-8.5 ×

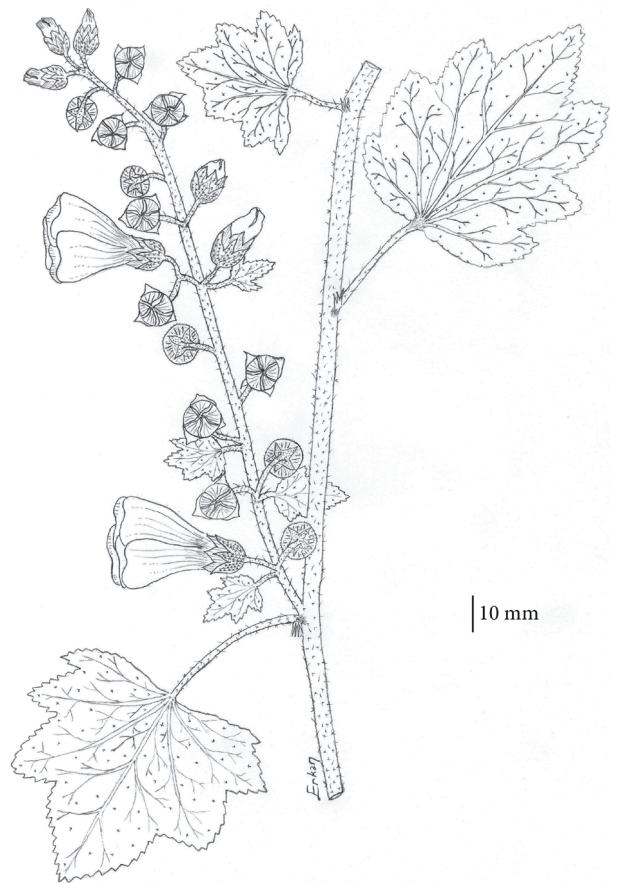


Figure 7. Habitus of *Alcea apterocarpa*.

0.9-10 cm, orbicular, lanceolate, cordate, cuneate-truncate at the base, margin crenate-serrate, apex obtuse; 3-5-lobed, lobes 0.2-5 × 0.3-4 cm, oblong-ob lanceolate. Petiole 0.2-9 cm, stellate hairy. Stipule 4-5-fid, 3-12 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate-pilose hairy. Inflorescence raceme, 1-3 flowered fascicles in the leaf axils. Pedicels 0.2-6 cm. Epicalyx 6-8, connate at the base; lobes 5-15 × 2-6 mm, lanceolate, margin entire, apex acuminate, obtuse, densely stellate-pilose hairy. Epicalyx more than ½ as long as the calyx. Sepals 5, connate at the base, ± conspicuously striate, 8-22 × 3-7 mm, lanceolate, margin entire, apex obtuse, acuminate, densely stellate-pilose hairy. Petals 5, white, yellow or pink-violet, 3-6.5 × 1-2.5 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 1-6 mm, glabrous. Stylus divided toward the apex. Mericarps 3-6 × 3.5-5.5 mm, orbicular,

brown, wingless, $\pm$ conspicuously rugose, stellate-pilose hairy, pilose hairy on lateral side. Seeds $2-3 \times 3-4$ mm, reniform, brown, tuberculate, sparsely to densely pilose hairy around hilum.

Fl. 5-7, Fr. 6-8, Habitat: roadsides, fields, rocky slopes, calcareous, steppe, maquis, 10-2000 m.

Examined specimens: Turkey, A2 İstanbul: Ayvalık, Çınarcık, Karpuz river, 10 m, 01.08.1981, Ş.Yıldırım 4397 (HUB); A4 Kırıkkale: Koçubaba village, 1200 m, roadsides, 22.08.1994, A.A.Dönmez 4204 (HUB); Ankara: Nallıhan-Beyazır, 19 km, 600 m, 15.06.2004, roadsides, $40^{\circ}06'17''N$, $31^{\circ}32'16''E$, *E.Uzunhisarcıklı* 1971 (GAZI); A9 Ağrı: W of Telçeker village, 15 km W of Bazargan-Iran boundary, 1500 m, 20.08.1972, *A.Hub.-Mor.* 7990 (ANK); Afyon: Akdağmadeni, 13.07.1954, *B.Kasaplıgil* 5012 (ANK); B4 Ankara: Beytepe Kampüsü, around the building of technology, steppe, 950 m, 06.08.1994, A.A.Dönmez 4134 (HUB); Beytepe campus, 1000 m, 30.06.1975, *S.Erik* 1345 (HUB); Beyazır, Cuma river, 1500 m, 02.07.1972, *Y.Akman* 8965 (ANK); B5 Aksaray: Kızılkaya village, Aşıklihöyük, c. 1120 m, 28.07.1994, *F.Ertuğ* 64 (GAZI); Aksaray-Akçakent, 20 km, 800-950 m, 17.06.2003, roadsides, *E.Uzunhisarcıklı* 1868 (GAZI); B6 Maraş: Göksun, E of Saraycık village, roadsides, 1300 m, 18.07.1977, *B.Yıldız* 1023 (HUB); Göksun, 100 m to Püren tunnel, 1450 m, 23.07.2003, rocky slopes, *E.Uzunhisarcıklı* 1896 (GAZI); Göksun-Geben, 10-15 km, 1400 m, 04.06.2006, roadsides, *E.Uzunhisarcıklı* 2183 (GAZI); B8 Erzurum: Palandöken D.s, Tekman-Ejder Hill, 7 km, Aras riverside, 2000 m, 26.08.1989, *K.Alpınar, H.Hart s.n.* (ISTE 60771); Erzurum-Horasan, 50 km, 1589 m, 16.08.2004, roadsides, *E.Uzunhisarcıklı* 1998 (GAZI); Pasinler-Hınıs, 29 km to Hınıs, 1875 m, 19.08.2005, roadsides, *E.Uzunhisarcıklı* 2117 (GAZI); Muş: Solhan-Muş, 36 km to Muş, 1700 m, 16.08.2005, calcareous, *E.Uzunhisarcıklı* 2099 (GAZI); C2 Denizli: Dazkırı-Denizli, Acıgöl, 850 m, 22.06.2003, roadsides, *E.Uzunhisarcıklı* 1886 (GAZI); C4 Antalya: Alanya, 10-400 m, 04.08.1982, Ş.Yıldırım 4421 (HUB); Gazipaşa, Sugözü village, Akçal D., 1900 m, 05.08.1984, *H.Sümbül* 3245 (HUB); İçel: Anamur, Anamur-Kazancı, Kızıllalan, 1400 m, 24.06.1984, *H.Sümbül* 3111 (HUB); C5 Niğde: 10 km to Ulukışla, 1000-1100 m, 17.06.2003, roadsides, *E.Uzunhisarcıklı* 1872 (GAZI); *ibid.*,

E.Uzunhisarcıklı 1873 (GAZI); Ulukışla-Pozantı, 30 km to Pozantı, 1000-1100 m, 17.06.2003, rocky slopes, *E.Uzunhisarcıklı* 1875 (GAZI); *ibid.*, *E.Uzunhisarcıklı* 1876 (GAZI); Adana: Yarpuz-Taşoluk, 2-3 km, 1000-1100 m, 23.06.2004, rocky slopes, *E.Uzunhisarcıklı* 1981 (GAZI); Ceyhan-Toprakkale, 40 m, 09.07.2005, roadsides, *E.Uzunhisarcıklı* 2069 (GAZI); C6 Maraş: Engizek D., around Aksu District, 1000 m, 10.06.1987, field, *H.Duman* 2994 (GAZI); Çağlayancerit, Öksüz D., Ziyaretağaçlı Hill, 1200-1300 m, 06.07.1991, steppe, *H.Duman* 4840 (GAZI); Karacasu-Gaziantep, 26 km, 700 m, 10.06.2004, open area of *Quercus*, *E.Uzunhisarcıklı* 1930 (GAZI); Pazarcık-Gölbaşı, 30 km to Gölbaşı, 832 m, 10.06.2004, field, *E.Uzunhisarcıklı* 1936 (GAZI); 2-4 km from Çağlayancerit, 827 m, 10.06.2004, roadsides, *E.Uzunhisarcıklı* 1938 (GAZI); Karacasu-Narlı, 3 km, 600-650 m, 10.06.2004, plantation area of *P. brutia*, *E.Uzunhisarcıklı* 1928 (GAZI); *İbid.*, 745 m, 03.07.2006, *E.Uzunhisarcıklı* 2181 (GAZI); Hatay: Arsuz, Amanos D., *P. brutia* forest, 200 m, 21.05.1968, *Y.Akman* 479 (ANK); Kırıkhan-Hassa, 30 km to Hassa, 140 m, 09.07.2005, roadsides, *E.Uzunhisarcıklı* 2071 (GAZI); Gaziantep: 850 m, 20.06.1935, *E.K.Balls* 2331 (ANK); C7 Adıyaman: Gölbaşı, Bağlarbaşı village, ca. 900 m, 25.06.1989, Ö.Seçmen, G.Görk, *E.Leblebici s.n.* (EGE 32153); Diyarbakır: Diyarbakır-Siverek, 16 km from Diyarbakır, 07.06.1971, fallow field, *A.Baytop s.n.* (ISTE 20095); Urfa: Urfa-Viranşehir, 14 km, 480 m, 12.06.2004, roadsides, *E.Uzunhisarcıklı* 1944 (GAZI).

Distribution: Turkey, Iraq, Egypt. Widespread.

Alcea apterocarpa morphologically is similar to *Alcea biennis*. It differs by its wingless mericarps, and so it is difficult to separate them without fruit.

7. *Alcea kurdica* (Schltdl.) Alef., Oesterr. Bot. Z.12: 253 (1862). (Figure 8).

= *Althaea kurdica* Schlecht., Linnaea 17: 127 (1843).

Type: [Iraq] in faucibus regionum altionum saxosarum montis Gara Kurdestaniae, *Kotschy s.n.* (W!).

Perennial, plant 20-80 cm, erect, branched at the base. Stem 2-7 mm diam., cylindrical, glabrous or rarely sparsely stellate hairy. Basal leaves palmatilobate, $1-6 \times 1.5-7$ cm, orbicular, truncate at



Figure 8. Habitus of *Alcea kurdica*.

the base, margin crenate, apex obtuse, stellate hairy; inconspicuously lobed. Petiole 3-10 cm, stellate hairy. Stipule absent or present, 3-5 mm; lobes linear-lanceolate, margin entire, apex obtuse, stellate hairy. Cauline leaves palmatilobate-palmatipartite, 1-5 × 0.5-5 cm, orbicular, truncate at the base, margin crenate, apex obtuse, stellate hairy; lobes 0.3-3.5 × 0.3-1.5 cm, oblong-ob lanceolate. Petiole 0.5-7 cm, stellate hairy. Stipule absent or 2-fid, 2-4 mm; lobes linear-lanceolate, margin entire, apex acuminate or obtuse, densely stellate hairy. Floral leaves palmatifid-palmatipartite, 0.6-3 × 0.5-3.5 cm, orbicular, lanceolate, truncate at the base, margin crenate-serrate, apex obtuse, densely stellate hairy; lobes

0.2-2.5 × 0.2-0.8 cm, oblong-ob lanceolate. Petiole 0.3-3 cm, stellate hairy. Stipule 2-fid, 2-3 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Inflorescence raceme, single flower in the leaf axils, rarely 2. Pedicels 5-20 mm, stellate hairy. Epicalyx 6-9, connate at the base; lobes 1-4 × 1-3 mm, lanceolate, margin entire, apex acuminate, stellate hairy. Epicalyx less than ½ as long as the calyx. Sepals 5, connate at the base, conspicuously striate, 10-15 × 4-6 mm, lanceolate, margin entire, apex obtuse, acuminate, stellate hairy. Petals 5, white, pink, yellow, 2-5 × 0.7-1.2 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 2-5 mm, glabrous. Stylus divided toward the apex. Mericarps 4-5 × 4-5 mm, orbicular, straw, winged, furrowed, stellate-pilose hairy on lateral side. Seeds 1.5-2 × 2.5-3 mm, reniform, brown, slightly tuberculate, sparsely pilose hairy around hilum.

Fl. 6-9, Fr. 7-10, Habitat: roadsides, rocky slopes, calcareous, steppe, meadow, 750-2500 m.

Examined specimens: Turkey, A8 Artvin: Sarıgöl to Barhal (Hevek dere), 1100 m, granitic gorge, 01.08.1966, *P.H.Davis* 47696 (E); B9 Van: Başkale-Hakkari, c. 50 km from Başkale, 1800 m, shaded stony ground among rocks-open community, 30.08.1956, *E.M.McNeill* 686 (E); Van-Erciş, 40 km to Erciş, 1800-2000 m, 17.10.1992, steppe, roadsides, *H.Özçelik & Y.Altan* 4743 (GAZI); Muş: Çaylar, 1600 m, 11.07.1966, meadow, *P.H.Davis* 46361 (E); Bitlis: Tatvan, 25.08.1939, *M.Başarman* s.n. (ISTF 653); C8 Diyarbakır: Çermik, Sinek village, 750 m, 18.06.1985, calcareous, *A.Güner* 6487 (HUB); C9 Hakkari: Koçanis, 2500 m, 13.08.1954, slopes, *P.H.Davis* 24301 (ANK, E); C10 Hakkari: Cilo D., Cilo Yayla, Dizderesi, 2438 m, 10.08.1954, *P.H.Davis -N.V.Polunin* 24266 (ANK, E); Zap gorge near Bağışlı, 1500 m, 11.09.1986, steep stony, igneous slopes, *J.C.Archibald* 8325 (E); Başkale-Yüksekova, 40 km to Yüksekova, 1650 m, 29.07.1978, *A.Baytop, E.Tuzlacı, A.Meriçli* s.n. (ISTE 41275); Gülenli village, 12.08.1968, *T.Gözler* s.n. (ISTE 16133); Hakkari-Van, 3 km, 1300 m, 17.08.2005, calcareous, *E.Uzunhisarcıklı* 2102 (GAZI); Van-Hakkari, 60 km to Hakkari, 1830 m, 17.08.2005, calcareous, *E.Uzunhisarcıklı* 2101 (GAZI).

Distribution: Turkey, N Iraq, W & NW Iran. Irano-Turanian element.

8. *Alcea heldreichii* (Boiss.) Boiss., Fl. Orient. 1: 832 (1867). (Figure 9).

= *Althaea heldreichii* Boiss., Diagn. Pl. Orient. 2(1): 103 (1853).

= *A. bordzilowskii* Wissjul., Bot. Zhurn. AN USSR III, 1-2 (1946).

Type: [Greece] in faucibus m. Korthiah pr. Thessalonicam (supra Nilos), *Heldreich* 2339.

Perennial, plant 20-80 cm, erect, branched at the base or unbranched. Stem 2-10 mm diam., cylindrical, densely stellate hairy. Leaves entire-palmatilobate, rhomboid-ovate, upper surface sparsely, lower surface densely stellate hairy. Basal leaves $0.8-6 \times 1-6$ cm, cuneate-truncate or cordate at the base, margin crenate, apex obtuse. Petiole 1-20 cm, stellate hairy. Stipule simple or 2-fid, sometimes caducous, 2-5 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate hairy. Cauline leaves $1-6 \times 1-5$ cm, cordate, truncate at the base, margin crenate, apex obtuse; inconspicuously lobed. Petiole 1-12 cm, stellate hairy. Stipule entire or 2-3-fid, sometimes caducous, 2-4 mm; lobes linear-lanceolate, margin entire, apex acuminate or obtuse, densely stellate hairy. Floral leaves $0.8-4.5 \times 1-5$ cm, truncate, cordate at the base, margin crenate, apex obtuse; inconspicuously lobed. Petiole 0.5-4 cm, stellate hairy. Stipule 3-fid, sometimes caducous, 1.5-3 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate hairy. Inflorescence raceme, 1-2 flowered fascicles in the leaf axils, usually densely towards the apex. Pedicels 2-5 mm, densely stellate hairy. Epicalyx 6-7, connate at the base; lobes $1.5-5 \times 1-4$ mm, lanceolate, margin entire, apex acuminate, stellate hairy. Epicalyx less than $\frac{1}{2}$ as long as the calyx. Sepals 5, connate at the base, conspicuously striate, $6-20 \times 3-10$ mm, lanceolate, margin entire, apex obtuse, acuminate, densely stellate hairy. Petals 5, white, pinkish, yellowish at the base, $1-4 \times 0.8-1.5$ cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 1-5 mm, glabrous. Stylus divided toward the apex. Mericarps $2-4 \times 2-5$ mm, orbicular, brown, winged,

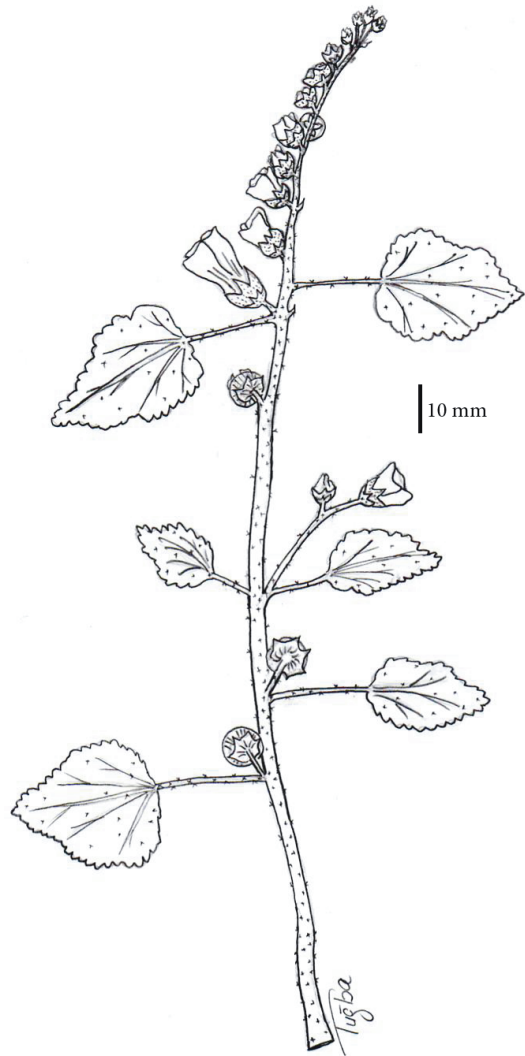


Figure 9. Habitus of *Alcea heldreichii*.

shallowly furrowed, stellate-pilose hairy on dorsal and lateral side. Seeds $1-2.5 \times 1-3$ mm, reniform, brown, slightly tuberculate, sparsely pilose hairy around hilum.

Fl. 6-8, Fr. 7-9, Habitat: roadsides, rocky slopes, steppe, open area of forest, 150-2000 m.

Examined specimens: Turkey, A9 Artvin: Kaçkal valley, along the Ortaköy forest road, 1600-2000 m, 15.08.1984, *N.Demirkuş* 2655 (HUB); B4 Ankara: Polatlı, Sırataşlar Tepesi, 840-850 m, 02.09.2004, steppe, *E.Uzunhisarcıklı* 2016 (GAZI); B9 Bitlis: Tatvan road, 24.08.1939, *M.Başarman s.n.* (ISTF 648); C3 Antalya: Prope Manavgat, *P. brutia* forest, 15.06.1966, *G.Oğuz s.n.* (EGE 4119); Antalya-Isparta,

20 km, 150 m, 08.07.2004, roadsides, *E.Uzunhisarcıklı* 1988 (GAZI); *ibid.*, 06.07.2005, *E.Uzunhisarcıklı* 2041 (GAZI); B5 Adana: Saimbeyli, 1100 m, valley below village, 11.07.1952, *P.H.Davis* 19880 (E); Adana-Pozantı, 2-3 km., 300-500 m, 24.06.2004, roadsides, *E.Uzunhisarcıklı* 1982a (GAZI).

Distribution: Turkey, Greece. E. Medit. element.

9. *Alcea calvertii* (Boiss.) Boiss., *Fl. Orient.* 1: 832 (1867). (Figure 10).

= *Althaea calvertii* Boiss., *Diagn. Pl. Orient.* 2(5): 66 (1856).

Type: [Turkey, A8 Erzurum] in Armenia circa Erzeroum, 1853, *Calvert s.n.*

Perennial, plant 20-70 cm, erect, branched at the base. Stem 2-10 mm diam., cylindrical, densely stellate hairy. Basal leaves entire-palmatilobate, 1.5-7 × 2-8 cm, orbicular, margin crenate, truncate-cuneate at the base, apex obtuse, stellate hairy; inconspicuously lobed. Petiole 4-18 cm. stellate hairy. Stipule 3-fid,

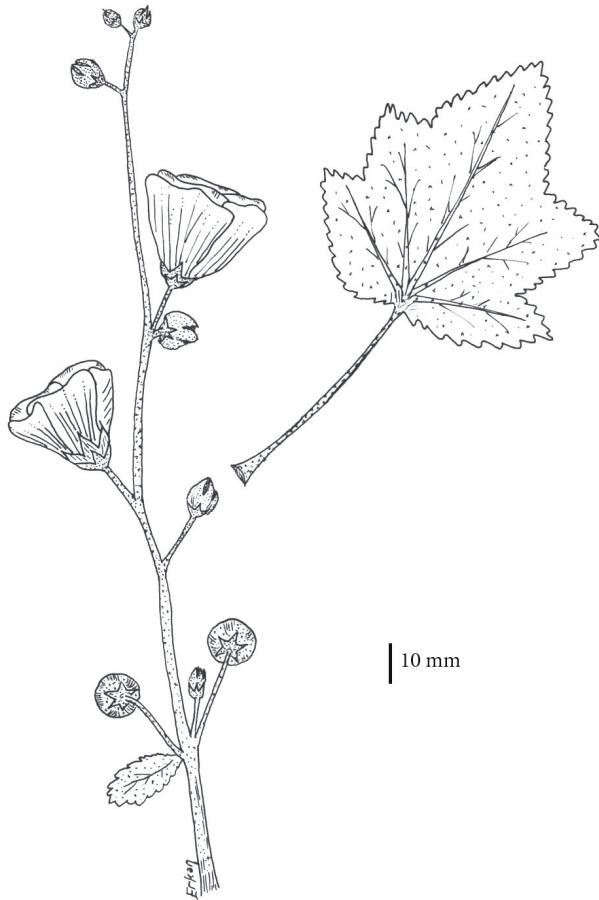


Figure 10. Habitus of *Alcea calvertii*.

1-2.5 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate-pilose hairy. Cauline leaves palmatilobate-palmatipartite, 0.8-7 × 0.6-9 cm, orbicular, rhomboid-ovate, margin crenate, cuneate-truncate at the base, apex obtuse, densely stellate hairy; 5-7-lobed, lobes 1-20 × 2-30 mm, oblong-ob lanceolate. Petiole 0.5-15 cm, stellate hairy. Stipule absent or 3-fid, 1-4 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate-pilose hairy. Floral leaves palmatilobate-palmatipartite, 0.3-4 × 0.3-4 cm, orbicular, lanceolate, margin crenate-serrate, truncate at the base, cuneate, apex obtuse, acuminate, densely stellate hairy; 3-5-lobed, lobes 0.5-15 × 1-15 mm, oblong-ob lanceolate. Petiole 0.5-45 mm, stellate hairy. Stipule absent or 2-5-fid, 1-3 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate-pilose hairy. Inflorescence raceme, 1-2 flowered fascicles in the leaf axils. Pedicels 6-35 mm, densely stellate hairy. Epicalyx 4-8, connate at the base; lobes 1-7 × 1-5 mm, lanceolate, margin entire, apex acuminate, obtuse, densely stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, conspicuously striate, 10-18 × 4-8 mm, lanceolate, margin entire, apex obtuse, acuminate, stellate hairy. Petals 5, white, greenish at the base, 2-4.2 × 0.5-2.5 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 0.5-3 mm, glabrous. Stylus divided toward the apex. Mericarps 3-5 × 3-5 mm, orbicular, brown, clearly winged, furrows stellate, pilose hairy on lateral side. Seeds 1-2 × 1.5-3 mm, reniform, brown, glabrous or slightly tuberculate, pilose hairy around hilum.

Fl. 6-8, Fr. 7-9, Habitat: roadsides, rocky and stony ground, steppe, calcareous, volcanic rocky slopes, 293-2800 m.

Examined specimens: Turkey, A8 Erzurum: Çoruh valley, İspir-Çamlıkaya, 1100 m, 29.07.1991, stiff rocky, *A.Güner* 9888 (GAZI); 40 km SW of Erzurum, Serçeme valley, 1980 m, 02.08.1976, *A.Tatlı* 5172 (HUB); Tuzla to Tortum, Bar valley, 09.08.1981, *N.Demirkuş s.n.* (HUB); Tortum, Tortum lake, Demirlirampa, 900-1600 m, 27.07.1984, *N.Demirkuş s.n.* (HUB); Aşkale-Tercan, 15-20 km, 20.08.2005, roadsides, *E.Uzunhisarcıklı* 2119 (GAZI); Artvin: Yusufeli, Yaylalar village, Mikelis District, 1570 m,

stiff and deep granite valley, 30.07.1981, A.Güner 8821 (HUB); Şavşat-Artvin, 35 km to Artvin, 293 m, 17.08.2004, roadsides, rocky slopes, E.Uzunhisarcıklı 2011 (GAZI); Bayburt: Çoruh valley, 1 km S of Karşıgeçit village, 1425 m, 26.07.1991, steppe, A.Güner 9697 (GAZI, HUB); A9 Kars: Posof, Kediye nursery - Doğrula village, 1800-2200 m, 30.07.1985, N.Demirkuş 3149 (HUB); Erzurum: Olur, Akdağ, the fire tower to Olur, 1700-2500 m, 31.07.1984, N.Demirkuş 2169 (HUB); Artvin: Artvin-Ardanuç, volcanic rocky slopes, 600, 26.06.1957, P.H.Davis 30052 (ANK); B5 Kayseri: Felahiye, Eskiköprü, 1000-1050 m, 22.08.1999, S.Erik 6253 (HUB); B6 Yozgat: Akdağmadeni, S of Çakal village, Alacayar-Ortaköy, 1300 m, 21.07.1979, T.Ekim, A.Düzenli 4509 (ANK); B7 Tunceli: Pertek-Çemişgezek, 30 km, 1250 m, T.Ekim 8177 (GAZI); Pertek-Hozat, 1100 m, eroded banks, 13.07.1957, P.H.Davis 31018 (ANK, E, BM); Elazığ: İbolar village, İbolar valley, 850 m., 07.06.1980, H.Evren 358 (ANK); Euphrates-Elazığ, 4000 ft, igneous hills, 21.06.1954, P.H.Davis 22016 (ANK, E, BM); Elazığ-Diyarbakır, 22 km SW Elazığ, Çilemek D., 1250 m, 22.07.1979, M.Nydegger 14458 (E); Elazığ-Bingöl, 30 km from Elazığ, 22.07.1969, roadsides, T.Gözler s.n. (ISTE 15798); Erzincan: c. 15 km from W Erzincan, 1555 m, 19.08.1973, C.Calder 57 (E); B8 Erzincan: Erzincan-Kelkit, c. 12 km from Erzincan, 1500 m, dry shaley slopes, 01.08.1957, P.H.Davis 31914 (ANK, E, BM); Sivas-Erzincan, 5-10 km to Erzincan, 1200-1300 m, 15.08.2004, roadsides, E.Uzunhisarcıklı 1996 (GAZI); Erzincan-Kelkit, 1280 m, 20.08.2005, roadsides, E.Uzunhisarcıklı 2120 (GAZI); Mercan-Erzincan, 25-30 km, 1200 m, 31.07.2006, roadsides, E.Uzunhisarcıklı 2215 (GAZI); B9 Van: Erek D., 1800-2100 m, stony slopes, 08.1992, H.Özçelik 4707 (GAZI); C5 Konya: Ereğli, Aydos D., Gökçeyazı, 1400 m, 20.06.1977, steppe, calcareous, S.Erik 2164 (HUB); C9 Şırnak: Şenoba-Hakkari, 72 km, stony slopes, 1550 m, 15.07.2001, Z.Aytaç 8184 (GAZI).

Distribution: Turkey. Irano-Turanian element.

Alcea calvertii, which is similar to *Alcea heldreichii*, differs by the short length of its epicalyx and stem leaves distinctly 5-7 lobed, lower pedicels are more than 1 cm.

10. *Alcea hohenackeri* (Boiss.& Huet.) Boiss., Fl. Orient. 1: 833 (1867). (Figure 11).

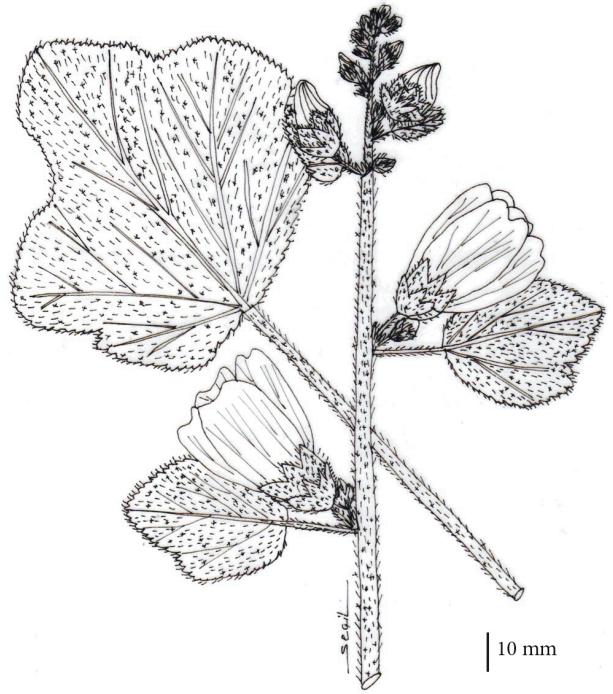


Figure 11. Habitus of *Alcea hohenackeri*.

= *Althaea hohenackeri* Boiss. & Huet., Diagn. Pl. Orient. 2(5): 67 (1856).

= *Alcea denudata* Boiss., Fl. Orient. 1: 833 (1867).

= *A. tholozani* Stapf, Denkschr. Akad. Wien 51: 308 (1886).

= *Althaea rugosa-stellulata* Czecz., Aeta Soe. Bot. Pol. 9: 35 (1932).

Lectotype: [Turkey] supra Elidja Armenjae in incultis, Huet. s.n.

Perennial, plant 40-200 cm, erect, branched at the base. Stem 3-10 mm diam., cylindrical, sparsely-densely stellate-pilose, setose hairy. Basal leaves palmatilobate, 5-13 × 7-15 cm, orbicular, margin crenate, truncate at the base, cordate, apex obtuse, stellate hairy; inconspicuously lobed. Petiole 5-30 cm, stellate-pilose hairy. Stipule caducous. Cauline leaves palmatilobate, 5.5-14 × 6.5-13 cm, orbicular, margin crenate, truncate at the base, cordate, apex obtuse, stellate hairy; inconspicuously lobed. Petiole 3-25 cm, stellate-pilose hairy. Stipule absent or 2-fid, 3-6 mm; lobes linear-lanceolate, margin entire, apex acuminate or obtuse, stellate-pilose hairy. Floral leaves palmatilobate-palmatifid, 1.5-8 × 1.5-9 cm, orbicular, lanceolate, margin crenate-serrate,

truncate at the base, cordate, apex obtuse, acuminate, stellate hairy; 3-5-lobed, lobes 0.3-3 × 0.2-4 cm, oblong-ob lanceolate. Petiole 0.5-6 cm, stellate-pilose hairy. Stipule 2-4-fid, 2-6 mm; lobes linear-lanceolate, margin entire, apex acuminate, obtuse, stellate-pilose hairy. Inflorescence raceme, flowers borne in fascicles of 1-5 in the leaf axils. Pedicels 2-25 mm, stellate-pilose hairy. Epicalyx 5-8, connate at the base; lobes 5-10 × 1.5-5 mm, lanceolate, margin entire, apex acuminate, obtuse, stellate hairy. Epicalyx more than ½ as long as calyx or ½ as long as calyx. Sepals 5, connate at the base, conspicuously striate, 8-18 × 4-8 mm, lanceolate, margin entire, apex obtuse, acuminate, densely stellate hairy. Petals 5, yellow, 3.5-5.5 × 1-5.5 cm, margin entire, apex entire, emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 3-10 mm, glabrous. Stylus divided toward the apex. Mericarps 4-6 × 2.5-5 mm, orbicular, brown, clearly winged, furrows stellate, pilose hairy on lateral side. Seeds 1.5-2 × 2-3 mm, reniform, brown, glabrous, pilose hairy around hilum.

Fl. 5-7, Fr. 6-8, Habitat: roadsides, rocky and stony ground, steppe, cultivated lands, calcareous, meadows, vineyards, alpine steppe, volcanic tuff, schistic metamorphic land, 500-2300 m.

Examined specimens: Turkey, A5 Çorum: Boğazkale, Boğazköy-Yazılıkaya Harabeleri, ca. 1210 m, 08.08.1984, Ö.Seçmen, E.Leblebici, H.Tabata-Yasuda s.n. (EGE 28717); A7 Trabzon: Hamsiköy, Cevizlik, 1200 m, 08.08.1933, Balls.-Gourlay 563 (ANK); Sümela-Maçka, 10 km to Maçka, 26.07.2006, roadsides, E.Uzunhisarcıklı 2196 (GAZI); Bayburt: Varuz D., 1300 m, 19.07.1934, E.K.Balls-H.W.Gourlay 1757 (ANK); Giresun: Gergene village, 700 m, 24.06.1977, Y.Akman 7118 (ANK); A8 Rize: İkizdere, Dereköy-Ballıköy, 16 km, 1360 m, roadsides, 07.08.1983, A.Güner 5155 (GAZI); İkizdere, Çiftköprü-Haya village, 1550 m, roadsides, 27.08.1984, A.Güner 6208 (GAZI); Gümüşane: Bayburt, 10.08.1968, T.Baytop s.n. (ISTE 14344); Bayburt-Aşkale, 40 km to Aşkale, ca. 1680 m, 16.08.1984, Ö.Seçmen, E.Leblebici, H.Tabata-Yasuda s.n. (EGE 28718); A9 Erzurum: Şenkaya-Aydoğdu (Mısı) village, 07.09.1993, steppe, Y.Altan 5661 (GAZI); Erzurum-Kars, 118

km, side of the bridge Kumlu, 1438 m, 16.08.2004, stream bed, E.Uzunhisarcıklı 2003 (GAZI); Tortum-Erzurum, 5-9 km, 1950 m, 19.08.2005, roadsides, E.Uzunhisarcıklı 2116 (GAZI); Narman-Tortum, 10 km, 1970 m, 19.08.2005, roadsides, E.Uzunhisarcıklı 2115 (GAZI); Artvin: Yalnızçam D.s, 1900 m, 18.08.1957, P.H.Davis & I.Hedge 32439 (ANK); Ardanuç-Ardahan, near the Kiagilis Church, 2300 m, 29.07.2006, alpine steppe, E.Uzunhisarcıklı 2210 (GAZI); Ardanuç, Kutul-Karakol, 16.07.1947, A.Heilbronn & M.Başarman s.n. (ISTF 7617); Kars: Sarıkamış, 21.07.1941, A.Heilbronn & M.Başarman s.n. (ISTF 7880); - Yalnızçam, Nazenbezer, 1900 m, 11.08.1976, V.Yüksel s.n. (ISTE 35730); Göle-Tahtakıran village, 02.08.1975, İ.Baran s.n. (EGE 12482); Kars-Göle, 25 km to Göle, 2100 m, 17.08.2004, meadows, E.Uzunhisarcıklı 2009 (GAZI); B4 Ankara: Çubuk, Buzlu, which is 2 km west of the town Çubuk, 1000 m, 08.07.1945, B.Kasaplıgil 23 (KNYA); Çubuk, 2 km S of Çubuk, 1000 m, meadows, 08.07.1945, B.Kasaplıgil 22 (KNYA); Ankara-Konya, 54 km from Gölbaşı, 26.07.1974, A.Baytop s.n. (ISTE 30551); B5 Nevşehir: Göreme, 4 km W of Göreme, 1130 m, 16.06.1989, volcanic tuff, field and roadside, M.Vural 5122 (GAZI); Göreme, 5 km W of Göreme, 1110 m, 07.08.1989, volcanic tuff, vineyards, M.Vural 5454 (GAZI); B6 Kayseri: Pınarbaşı, Kaynar, Hınzır D., 1900 m, 13.09.1979, N.Çelik s.n. (ANK); Malatya: Darende-Malatya, 16 km from Darende, 1080 m, 22.06.1977, A.Baytop, E.Tuzlacı, G.Sarıyar s.n. (ISTE 37749); Malatya-Darende, Ağılıyazı village, 1560 m, 06.07.1986, A.Mat.&C.Mat. s.n. (ISTE 56974); Doğanşehir, Eskiköy, Meletbaşı, c. 1900 m, 15.07.1971, calcareous, H. Peşmen s.n. (EGE 11863); Doğanşehir-Dedeyazı village, Keşiş D., c. 2100 m, 28.07.1971, H.Peşmen s.n. (EGE 11864); B7 Diyarbakır: Silvan, fallow field, 24.06.1954, P.H.Davis 22110 (ANK); Silvan-Diyarbakır, 55 km, 710 m, 10.07.2005, roadside, E.Uzunhisarcıklı 2079, 2080 (GAZI); Ergani-Maden, 10 km to Maden, 830 m, 10.07.2005, roadside, E.Uzunhisarcıklı 2082 (GAZI); Tunceli: Çukurköy, 09.07.1975, V.Yüksel s.n. (ISTE 32965); Elazığ: Karakoçan, Sarıbaşak village, 22.07.1969, T.Gözler s.n. (ISTE 15817); Erzincan: 25 km to Refahiye, Tülü village, 1000 m, 15.08.2004, roadside, E.Uzunhisarcıklı 1994 (GAZI); B8 Bingöl: Bingöl-Muş, 50 km, 23.07.1969, roadsides, T.Gözler s.n. (ISTE 15829); B9 Bitlis: Tatvan, Sorgun, Van Gölü,

1650-1700 m, 25.07.1972, volcanic slopes, *H. Peşmen* 3129 (HUB); Van: Çatak, 25.07.1954, *P.H. Davis-N.V. Polunin* 23163 (ANK); Akdamar, 1750 m, 17.09.1974, *A. Baytop & T. Baytop s.n.* (ISTE 30958); Ereğli, 2150 m, 26.08.1975, *A.H. Meriçli s.n.* (ISTE 33076); Van-Erciş, Çakırbey Karayolları Bakımevi, 1750 m, 19.09.1974, *A. Baytop & T. Baytop s.n.* (ISTE 31007); B10 Iğdır: Iğdır-Doğubeyazıt, 25 km, 1532 m, 16.08.2004, roadsides, *E. Uzunhisarcıklı* 2006 (GAZI); ibid., 32 km, 1293 m, *E. Uzunhisarcıklı* 2005 (GAZI); C6 Gaziantep: Gaziantep-Nizip, 13-15 km, 770 m, 09.07.2005, roadside, *E. Uzunhisarcıklı* 2076 (GAZI); C7 Şanlıurfa: Ceylanpınar, around Beyazkule, 09.06.1996, 550 m, *N. Adıgüzel* 2534 (GAZI); Urfa-Esemkolu, 13 km to Urfa, *Pistacia* gardens, 750 m, 16.06.1984, *A. Baytop & T. Baytop s.n.* (ISTE 54398); C8 Mardin: Mardin-Nusaybin, 600 m, 22.05.1957, *P.H. Davis & I. Hedge* 28407 (ANK); Cizre-Nusaybin, 14.06.1984, roadside, fallow field, *A. Baytop & T. Baytop s.n.* (ISTE 54368); Nusaybin-Mardin, 6 km, 600 m, 12.06.2004, roadside, *E. Uzunhisarcıklı* 1956 (GAZI); C9 Siirt: Tatvan, 18.07.1966, *G. Oğuz s.n.* (EGE 11866); C10 Hakkari: Yüksekova, around Iştazın (Yeşiltaş) village, 1400 m, 19.06.1975, schistic metamorphic land, *A. Güner* 1353 (HUB).

Distribution: Turkey, Iraq, Iran. Irano-Turanian element.

11. *Alcea pisidica* Hub.-Mor., Notes Roy. Bot. Gard. Edinburgh 27: 216 (1967). (Figure 12).

Type: Turkey B3 Isparta, d. Şarkikaraağaç, Eğridir to Gelendost, wheatfield, 50 km from Eğridir, 800 m, 2 VII 1948, *Huber-Morath* 8578 (holo. G!).

Perennial, plant 40-250 cm, erect, densely branched at the base or unbranched. Stem 0.3-2 cm diam., cylindrical, slightly furrowed, purplish sometimes in the middle or toward the base, sparsely to densely stellate-pilose hairy. Leaves entire-palmatilobate, margin crenate, apex obtuse, upper surface sparsely, lower surface densely stellate-pilose hairy; inconspicuously lobed. Basal leaves 5-12 × 6-15 cm, orbicular, cordate at the base. Petiole 5-15 cm. Stipule simple or 3-fid, 1-7 mm; lobes linear-lanceolate, margin entire, apex acuminate. Cauline leaves 2.5-8 × 1.5-10 cm, orbicular, lanceolate, cordate at the base, cuneate. Petiole 4-9 cm. Stipule 3-fid, 3-7 mm; lobes linear-lanceolate, margin entire, apex acuminate. Floral leaves 0.6-8 × 0.5-8.5 cm, orbicular,



Figure 12. Habitus of *Alcea pisidica*.

lanceolate, cuneate at the base, cordate. Petiole 0.4-5.5 cm. Stipule 3-fid, 4-12 mm; lobes linear-lanceolate, margin entire, apex acuminate. Inflorescence raceme, single flower or 1-5 flowered fascicles in the leaf axils. Pedicels 0.3-4 cm. Epicalyx 6-7, connate at the base; lobes 5-10 × 1-7 mm, lanceolate, margin entire, apex acuminate. Epicalyx more than ½ as long as calyx or ½ as long as calyx. Sepals 5, connate at the base, striate, 10-20 × 4-8 mm, lanceolate, margin entire, apex acuminate. Petals 5, yellow, sometimes greenish when dry, 2.5-5.5 × 1.2-3 cm, margin entire, apex entire or slightly emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube 2-6 mm, glabrous. Stylus divided toward the apex. Mericarps 5-6 × 5-7 mm, reniform-orbicular, straw-brownish, clearly winged, furrows stellate, sparsely stellate-pilose hairy on lateral side. Seeds 1-3 × 3-5 mm, reniform, brown, tuberculate, white pilose hairy around hilum and on dorsal side.

Fl. 6-7, Fr. 7-8, Habitat: fallow field, 800-1050 m.

Examined specimens: Turkey, B3 Isparta:

Gelendost-Eğirdir, 43 km to Eğirdir, 936 m, 08.07.2004, fallow field, 38°06'193"N 31°00'981"E, *E.Uzunhisarcıklı* 1987 (GAZI); *ibid.*, *E.Uzunhisarcıklı* 1985 (GAZI); Konya: Akşehir-Gelendost, 20 km to Gelendost, 1050 m, 06.07.2005, fallow field, *E.Uzunhisarcıklı* 2034 (GAZI); *ibid.*, *E.Uzunhisarcıklı* 2036, 2038 (GAZI)

Distribution: Turkey. Endemic. E. Medit. element.

Alcea pisidica was placed in DD category according to the *Red Data Book of Turkish Plants*; however, we had some collections from the southern parts of Turkey. This species is known from only 1 locality (criterion B2 a), with an area of occupancy estimated to be less than 10 km² (criterion B2); so it should be classified as "Critically Endangered (CR) (IUCN, 2010).

12. *Alcea guestii* Zohary, Israel J. Bot. 12: 3, t. 6 (1963). (Figure 13)

Type: Iraq, nr. Altun Kupri, Zab River, Bakhtiari, conglomerate hills, 1933, *Guest* 4019 (holo. K!).

Perennial, plant 20-70 cm, erect, branched at the base or unbranched. Stem 3-10 mm diam., cylindrical, slightly furrowed, densely pilose, stellate or fascicled hairy. Leaves palmatilobate, fleshy, margin serrate; distinctly veined at below surface, densely stellate-pilose hairy. Basal leaves 5-8 × 5-10 cm, orbicular, cordate at the base, truncate, apex obtuse, acute; 5-lobed, lobes 5-20 × 8-30 mm, oblong-ob lanceolate. Petiole 6-15 cm, densely stellate-pilose hairy. Stipule 3-4-fid, 8-10 mm; lobes linear-lanceolate, margin entire, apex acuminate, white pilose hairy, sometimes stellate-pilose hairy. Cauline leaves 4.5-8 × 4-7 cm, orbicular, truncate at the base, cuneate, apex acute; 3-5-lobed, inconspicuously lobed. Petiole 3-8 cm, stellate-pilose hairy. Stipule 2-3-fid, 5-10 mm; lobes linear-lanceolate, margin entire, apex acuminate, white pilose hairy. Floral leaves 1-6 × 0.5-5.5 cm, orbicular, triangular, cuneate at the base, apex acute, acuminate; 3-lobed, inconspicuously lobed. Petiole 0.3-5.5 cm, densely stellate hairy. Stipule 2-3-fid, 4-10 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Inflorescence raceme, 1-2 flowered fascicles in the leaf axils. Pedicels 1-3 cm, densely stellate hairy. Epicalyx 7-8, connate at the base; lobes 4-10 × 1.5-4 mm, lanceolate, margin entire, apex acuminate, densely stellate hairy. Epicalyx more than ½ as long as calyx. Sepals 5, connate at the base,



Figure 13. Habitus of *Alcea guestii*.

conspicuously striate, 12-20 × 3-8 mm, lanceolate, margin entire, apex acuminate, densely stellate hairy. Petals 5, yellow, white, are sometimes greenish when they are dry, 2.5-4.5 × 1-2.5 cm, margin entire, apex entire or slightly undulate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube 2-4 mm, glabrous, angular or cylindrical. Stylus divided toward the apex. Mericarps 4.5-6 × 5-7 mm, orbicular, yellowish-brown, clearly winged, stellate-pilose hairy. Seeds 2-2.5 × 3.5-4 mm, reniform, brown, tuberculate, white pilose hairy around hilum.

Fl. 5-6, Fr. 6-7, Habitat: steppe, roadsides, 360-450 m.

Examined specimens: Turkey, C7 Urfa: Viranşehir-Ceylanpınar, 34-36 km, 450 m, 12.06.2004, roadsides, steppe, 36°57'25"N 39°39'33"E, *E.Uzunhisarcıklı* 1954 (GAZI).

Distribution: Turkey, Iraq, Iran. Irano-Turanian element.

Alcea guestii with its succulent form and serrate leaves is separate from other species. Several collections of *Alcea guestii* from Urfa-Ceylanpınar (the number of individuals in the population less than 50, criterion D) caused us to change its threat category to CR (IUCN, 2010).

12. *Alcea biennis* Winterl, Index Hort. Bot. Pest A2 (1788). (Figure 14).

= *Althaea pallida* Waldst. & Kit. ex Willd., Sp. Pl. 3: 773 (1800). Ic: Reichb., Ic. Fl.

Germ. 5:t. 175 (1841).

= *Alcea pallida* Waldst. & Kit., Pl. Rar. Hung. 1: 46, t. 47 (1800-1801).

= *Althaea biennis* (Winterl) Borb., Balat. Fl. 401 (1900); Ic: Hejny & Slavik, Kvitená Eeske Republiky 3: t.66 f. 1 (1992).

Type: Described from Hungary.

Perennial, plant 30-120 cm, erect, branched at the base. Stem 2-18 mm diam., cylindrical, sometimes slightly furrowed, densely stellate hairy. Basal leaves entire-palmatilobate, 3.5-10 × 4-12 cm, orbicular, truncate-cuneate or cordate at the base, margin crenate, apex obtuse, stellate hairy; inconspicuously lobed. Petiole 8-25 cm, stellate hairy. Stipule 3-fid or sometimes caducous, 3-5 mm; lobes linear-lanceolate, margin entire, apex acuminate, obtuse, densely stellate hairy. Cauline leaves palmatilobate, 2.5-10 × 2-10 cm, orbicular, cordate at the base, truncate, margin crenate, apex obtuse, densely stellate hairy; 5-7-lobed, lobes 0.5-2 × 0.8-4.5 cm, oblong-ob lanceolate. Petiole 1-12 cm, stellate hairy. Stipule 2-3-fid, 2-6 mm; lobes linear-lanceolate, margin entire, apex acuminate or obtuse, densely stellate hairy. Floral leaves palmatilobate-palmatifid, 0.8-6 × 0.6-7 cm, orbicular, lanceolate, truncate at the base, cordate, margin crenate, apex obtuse, densely stellate hairy; 3-5-lobed, lobes 0.2-3 × 0.2-2.5 cm, oblong-ob lanceolate. Petiole 0.1-4.5 mm, stellate hairy. Stipule 2-4-fid, 2-6 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate hairy. Inflorescence raceme, 1-3 flowered fascicles in the leaf axils. Pedicels 1-25 mm, stellate hairy. Epicalyx 6-8, connate at the base; lobes 5-15 × 2.5-10 mm, lanceolate, margin entire, apex acuminate, obtuse, densely stellate hairy. Epicalyx more than ½ as long as calyx. Sepals 5, connate at the base, conspicuously

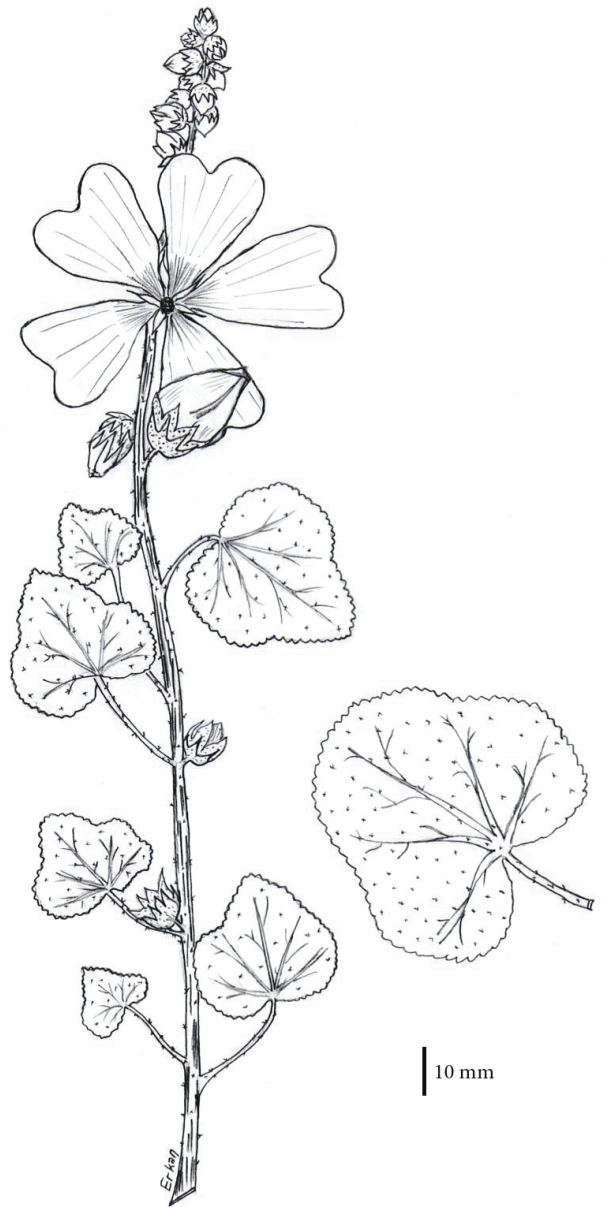


Figure 14. Habitus of *Alcea biennis*.

striate, 9-17 × 4-8 mm, lanceolate, margin entire, apex obtuse, acuminate, densely stellate hairy. Petals 5, white, lilac, pink, purple, yellowish-green at the base, 2-5 × 1-4 cm, margin entire, apex emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 1.5-6 mm, glabrous. Stylus divided toward the apex. Mericarps 2-4 × 2-5 mm, orbicular, brown, straw, winged, rugose, pilose hairy. Seeds 1-3 × 2-4.5 mm, reniform, brown, glabrous, white pilose hairy around hilum.

Fl. 5-9, Fr. 6-10, Habitat: steppe, rocky limestone slopes, serpentine, calcareous, vineyards, river bed, fallow field, roadsides, stony slopes, river banks, alpine steppe, open area of forest, maquis, sandy places, 0-1900 m.

Examined specimens: Turkey, A1 Kırklareli: Poyralı, 12.06.1968, *A.Baytop s.n.* (ISTE 13223); İğneada-Liman, 29.07.1974, roadside, *A.Baytop s.n.* (ISTE 30695); Vize-Poyralı, 11.06.1968, *A.Baytop s.n.* (ISTE 13217); Lüleburgaz-Babaeski, 16.07.1968, *A.Baytop s.n.* (ISTE 15659); Dereköy, 24.07.1968, river bed, *A.Baytop s.n.* (ISTE 14577); Demirköy, 26.06.1968, *A.Baytop s.n.* (ISTE 13923); Tekirdağ: Muratlı, 13.06.1968, *A.Baytop s.n.* (ISTE 13359); Hayranbolu, near Tekirdağ, 24.07.1969, *A.Baytop s.n.* (15789); Edirne: Uzunköprü, 23.07.1968, roadside, *A.Baytop s.n.* (ISTE 14519); Çanakkale: Burhanlı-Eceabat, 29.07.1971, roadside, *A.Baytop s.n.* (ISTE 20732); Eceabat-Gelibolu, 20 km, 0-5 m, 22.07.2006, roadside, *E.Uzunhisarcıklı* 2188 (GAZI); Gelibolu-Eceabat, 10 km to Eceabat, 09.11.1968, *A.Baytop, B.Çubukçu s.n.* (ISTE 14717); Gökçeada-Aydıncık Burnu, around Tuzgölü, ca. 5 m, 30.06.1975, *Ö.Seçmen s.n.* (EGE 22780); Gökçeada, Zeytinli-Merkez, ca.s.1, 1976, *Ö.Seçmen s.n.* (EGE 22771); Gökçeada, Kömürburnu-Cezaevi, ca. 50 m, 17.06.1976, *Ö.Seçmen s.n.* (EGE 22772); Truva Harabeleri, ca. 50 m, 26.07.1984, *Ö.Seçmen, Y.Gemici, H.Tabata-Yasuda s.n.* (EGE 28713); Gökçeada, Aydıncık Burnu, sandy places, ca. s.1., 14.10.1976, *Ö.Seçmen s.n.* (EGE 22770); A2 İstanbul: Sinekli-Gümüşpınar, fallow fields, 17.07.1969, *A.Baytop s.n.* (ISTE 15694); Anadoluhisarı, Hekimbaşı Salih ef. Yalı's ridges on the back, 24.08.1983, *A.Baytop s.n.* (ISTE 54876); Campus of Boğaziçi University, 18.07.1972, *G.Ertem s.n.* (ISTE 22976); Ormanlı village, below *Quercus*, 18.08.1968, roadside, *A.Baytop s.n.* (ISTE 14184); Balıkesir: S of Marmara Adası, river bed, 15.06.1968, *A.Baytop s.n.* (ISTE 13622); Bursa: Karacabey, Yeniköy-Kurşunlu, 1 km, 10.09.1982, *G.Eliçin s.n.* (ISTE 25820); Uludağ, Soğukpınar, 08.1948, *A.Heilbronn s.n.* (ISTF 8391); Uludağ, İnkaya, 07.09.1944, *M.Başarman s.n.* (ISTF 4778); near İnegöl, 300 m, banks by Sakarya river, perennial, flowers pink, 06.08.1966, *P.H.Davis* 47776 (E, K); Bilecik: Pazaryeri, 750 m, edge of fields, unica, 02.07.1962, *P.H.Davis* 36484 (E); Bilecik, limestone gorge near station, 300 m, rocky limestone slopes,

02.07.1962, *P.H.Davis* 36512 (E); A3 Bolu: Kale, Tekneci river, 900-1000 m, open area of forest, 12.07.1990, *İ.Kılınç* 1212 (GAZI); edge of Abant lake, 28.08.1957, *N.Özhatay* (ISTE 5059); Abant lake, 1200 m, steep earth banks (*Abietum*), 1 m, 11.07.1962, *P.H.Davis* 37251 (E); Around Abant lake, ca. 1350 m, 03.08.1984, *Ö.Seçmen, Y.Gemici, H.Tabata-Yasuda s.n.* (EGE 28716); Zonguldak: Keltepe, above Yenice, 1200 m, banks in *Fagus/Abies* forest, flowers pink, 20.07.1962, *P.H.Davis* 37786 (E); A4 Ankara: Kızılcahamam, s.m.p., around İncepeliş, 1500-1600 m, 25.08.1989, roadside, *Ö.Eyüboğlu* 1233 (GAZI); Nallıhan, 650 m, gravel river bed, flowers white, 1 m. tall, 09.07.1962, *P.H.Davis* 37047 (E, K); Nallıhan-Beyazarı, 28 km, 500-550 m, 15.06.2004, roadside, 40°06'58"N, 31°39'26"E, *E.Uzunhisarcıklı* 1973 (GAZI); Polatlı-Sivrihisar, Acıkır, 705 m, 22.06.2005, steppe, *E.Uzunhisarcıklı* 2028 (GAZI); Polatlı-Yunak, 18 km to Yunak, 1050 m, 06.07.2005, roadside, *E.Uzunhisarcıklı* 2030 (GAZI); Kırıkkale-Elmadağ, 06.06.1969, roadside, *T.Baytop s.n.* (ISTE 15467); Çankırı: Atkaracalar, Dumanlı D., Alma Çukuru-Karaküllü river, 1250-1350 m, 31.07.1991, steppe, *A.Duran* 1396 (GAZI); Kastamonu: Azdavay, 30 km to Daday, 1350 m, 25.10.1978, *O.Ketenoglu* 1358 (KNYA); Ilgaz, Hacıhasan village, 1000-1400 m, 25.06.2003, stony slopes, *E.Uzunhisarcıklı* 1894 (GAZI); Ilgaz D., Çilesiz-Handüzü, 30.10.1981, *E.Yurdakulolçu-M.Demirörs* 11736 (ANK); Tosya, Gökceviz village, 1000-1400 m, 25.06.2003, stony slopes, *E.Uzunhisarcıklı* 1893 (GAZI); Tosya, Sekiler village, Seki river, 28 .09.1977, *M.Kılınç* 200 (ANK); A5 Amasya: Direkli village, Cıpcı, ca. 1050 m, 07.08.1987, roadside, *S.Peker* 1679 (GAZI); Amasya Kalesi, 700 m, 25.06.1977, *K.Alpınar* (ISTE 37949); Akdağ, Suluova-Aktaş, Karakise village, Sugözü plateau, 1600 m, 12.08.1977, *K.Alpınar s.n.* (ISTE 38422); Yozgat: Çekerek, 14.07.1979, rocky slopes, *R.İlarslan s.n.* (ANK); Kastamonu: Azdavay-Daday, 34 km to Daday, 25.10.1978, *O.Ketenoglu s.n.* (ANK); Tosya, Gökcewis, *Sint.* 1892: 4625 (BM); A9 Kars: Göle, Uğurlu, 2100 m, 07.07.1975, *R.Çetik* 5672 (KNYA); B1 İzmir: Kemalpaşa, Nif D., 01.05.1966, *C.Regal* 23981 (ANK); Tire, 08.07.1973, river banks, *E.Tuzlacı s.n.* (ISTE 26260); Balıkesir: Ida (Kaz Da.), Szu-Szus D., *P.E.E.Sint.* 1883: 657 (E); B2 Manisa: Manisa D., Kızılkaya, 700-800 m, 15.06.1983, *H.Duman* 1113 (GAZI); Akhisar-Gördes, 163 m,

27.05.2005, roadside, 39°00'31"N, 27°52'47"E, *E.Uzunhisarcıklı* 2025 (GAZI); B3 Eskişehir: Türkmen D., Çimen Pınaraltı, 1500 m, 25.07.1976, river banks, *T.Ekim* 2559 (ANK); Eskişehir: 13 km N of Eskişehir, *Artemisia* steppe, 900 m, 15.07.1962, *M.Zohary* 1570 (E); Kütahya: Kütahya to Eskişehir, 900 m, in calcareous gorge 10-15 km N of Kütahya, 07.07.1962, *P.H.Davis* 37008 (E); Konya: Akşehir, Sultan D.-Cankurtaran village, 1450 m, 18.07.1978, rocky slopes, *H.Ocakverdi* 318 (KNYA); Akşehir, Sultan D., above Hıdırlık D. Hotel, 1070 m, 03.07.1975, *G.Dökmeci s.n.* (ISTE 32519); Akşehir, Sultan D., above Atakent (Nadirköy), 1200 m, 04.07.1975, *G.Dökmeci, A.Aytaç s.n.* (ISTE 32573); Akşehir, Dereçime-Ulupınar, 25.10.1975, *A.Baytop s.n.* (ISTE 33984); B4 Ankara: garden of Gazi Eğitim Fakültesi, 850 m, 28.06.1983, ruderal area, *M.Vural* 2277 (GAZI); Elmadag, Edige-Hisar, 1164 m, 29.06.1970, serpentine, steppe, *M.Kılınç* 117 (ANK); Beynam, 05.07.1947, *P.H.Davis* 13098 (E); İncesu, 28.06.1942, steppe, *H.Bağda* 501 (ANK); İncesu, 25.06.1932, *W.Kotte* 310 (K); Çubuk valley, 01.07.1939, steppe, *B.Kasaplıgil s.n.* (ANK); Çubuk dam, *K.Karamanoğlu s.n.* (ANK); Kırıkkale: Keskin, Böbrek D., Tilkili village, Kızıöz, 600 m, 20.06.1992, edge of vineyards, *Ü.Güler* 1676 (GAZI); C1 Aydın: Alaşehir, 30 VI 1905, *St.Lager s.n.* (BM); C2 Muğla: Köyceğiz, Sultaniye, Cindersi, roadsides, 15 m, 21.05.1991, *A.Güner* 9146 (GAZI, HUB); Datça, S of Kocadağ, 13.05.1984, *E.Tuzlacı s.n.* (ISTE 53615); Denizli: Taşocağı, *P.H.Davis* 13236 (ANK, E, K); from Çukurköy to Denizli, hillside, 28.06.1972, *E.Tuzlacı s.n.* (ISTE 22716); Dazkırı-Denizli, edge of Acıgöl, 850 m, 22.06.2003, roadside, 37°50'18"N, 29°45'46"E, *E.Uzunhisarcıklı* 1885 (GAZI); Acıpayam-Kelekçi, 10 km to Kelekçi, Çakır village, 850 m, 22.06.2003, roadside, *E.Uzunhisarcıklı* 1887 (GAZI); Antalya: Elmalı, 4 km S of Elmalı, 1080 m, 25.06.1975, *R.Çetlik* 1895 (KNYA); C3 Antalya: Akseki, S of Gidefi D., 1550 m, 04.07.1994, stony steppe, *A.Duran* 1758 (GAZI); Manavgat-Akseki, 465 m, 06.07.2005, roadside, *E.Uzunhisarcıklı* 2046 (GAZI); Antalya-Isparta, 75 km, 700 m, 08.07.2004, roadside, *E.Uzunhisarcıklı* 1990 (GAZI); Elmalı, 15.06.1860, *Bourgeau*. (K); Elmalı-Çıglikara, *P. brutia* forest, 15.06.1976, *Y.Akman* 7909 (ANK); 4 km S of Elmalı, 1080 m, 25.06.1975, calcareous, *R.Çetlik* 1895 (ANK); Elmalı-Çıglikara, *Pinus brutia* forest, 15.06.1976,

Y.Akman 7909 (ANK); Kumluca, above Adrasan village, 120 m, 08.06.1979, calcareous, *H.Peşmen* 4409 (ANK); above Yağca village, 320 m, 15.06.1978, rocky slopes, *R.Çetlik* 6202 (KNYA); Finike, 100 m, 13.05.1976, *Calicotome villosa* macchie, *R.Çetlik* 5163 (KNYA); Alanya Kalesi, 26.05.1966, *A.Baytop, T. Baytop, B.Çubukçu s.n.* (ISTE 9690); Isparta: Eğridir, c. 950 m, 12.06.1969, *N.Aydar s.n.* (EGE 11368); Eğridir, closed military zone, 23.09.1968, roadside, *F.Mutlu s.n.* (EGE 11870); Akşehir-Gelendost, 5 km, Sultan D., 1400 m, 08.07.2004, rocky slopes, *E.Uzunhisarcıklı* 1984 (GAZI); Burdur: Karamanlı-Tefenni, 1130 m, 29.06.2005, roadside, *E.Uzunhisarcıklı* 2029 (GAZI); Konya: Beyşehir, Yeşildağ-Damlala, 1200 m, 18.06.1980, *Q. coccifera* maquis-stony ground, *M.Serin* 547 (KNYA); Beyşehir-Kurucaova, edge of Beyşehir Lake, c. 1200 m, 25.07.1975, *A.Güner* 2304 (HUB); C4 Konya: Ermenek-Kayaönü village, 1200 m, 17.06. 1979, steppe, *M.Vural* 1702 (ANK); Seydişehir, Sultan Pınarı, 1250 m, 17.06.1980, *H.Ocakverdi* 796 (ANK); Merkez, towards Hatıp, 1050 m, vineyards, 28.09.1989, *A.Tatlı, M.Serin, B.Eyce* 9364 (KNYA); Yunak-Akşehir, 5 km to Akşehir, 1050 m, 06.07.2005, roadside, *E.Uzunhisarcıklı* 2031 (GAZI); Silile-Büyükgevele hill, 1300-1500 m, 05.07.1979, *H.Dural* 424 (KNYA); Hadim, Bademli village-Göksu valley, 750 m, 10.06.1987, roadside, *M.Serin* 1277 (KNYA); Seydişehir, Maden road, 1100 m, 21.07.1980, edge of marshy ground, *H.Ocakverdi* 796 (KNYA); Altınova Devlet Üretim Çiftliği, 16.06.1964, *R.Çetlik s.n.* (KNYA); Karapınar, Karacadağ-Salur village, 1050 m, 24.06.1983, roadside, *H.Dural* 1430 (KNYA); Antalya: Geyik D., Hanboğaz forest, 1800 m, *P.H.Davis* 14714 (ANK); Mersin: Anamur, Sarıdana Orman İşletmesi, 450-630 m, 24.05.1976, *R.Çetlik, M.Vural, M.H.Khan* 4785 (KNYA); Mersin: Nurdağı, around Alman Pınarı, 16.05.1964, *R.Çetlik s.n.* (KNYA); Karaman: Kazımkarabekir, Kızılyaka-Hacıbaba D., 1650 m, Ağaçbaba hill, *Juniperus excelsa* society, 10.07.1984, *M.Serin* 1556 (KNYA); C5 Adana: Pozantı, Gülek plateau, 1075 m, 02.09.1992, *Y.Karakaş, G. Eger* 81 (KNYA); İçel: foothills of Bolkar D., ridge 1 km W of Arslanköy, dry hillside with scattered *Cedrus* and *Cupressus*, 1900 m, 05.08.1976, *Peat et al.* 76-3-76 (E); C6 Maraş: Çağlayancerit, Öksüz D., Çığralı tepe, 1500-1700 m, 05.07.1991, alpine steppe, *H.Duman* 4025 (GAZI);

Göksun, Binboğa D., in ravine above Yalak, 1500 m, 14.07.1952, *P.H.Davis* 19960 (E, K); C7 Urfa: Siverek, fields, 800 m, 26.05.1967, *M.Zel* 1105 (ANK).

Distribution: Turkey, Hungary, Balkans. Widespread.

13. *Alcea dissecta* (Baker) Zohary, Israel J. Bot. 12: 16 (1963). (Figure 15).

= *Althaea dissecta* Baker, J. Bot. 28: 143 (1890).

Syntype: [Palestine] Galilee, Lowne; [Lebanon] Duma, *Post. s.n.*

Perennial, plant 30-200 cm, branched at the base or unbranched. Stem 5-15 mm diam., cylindrical, sometimes slightly furrowed, glabrous or stellate-tomentose hairy. Leaves palmatipartite-palmatisect, margin crenate-serrate, apex obtuse, acuminate, glabrous or upper surface sparsely, lower surface densely stellate hairy. Basal leaves palmatisect, 5-12 × 6-20 cm, orbicular, truncate at the base, cuneate; 5-7-lobed, lobes 2.5-12 × 0.8-2.2 cm, oblanceolate. Petiole 10-20 cm. Stipule 3-5 lobed, 1-7 mm; lobes linear-lanceolate, margin entire, apex acuminate, densely stellate hairy. Cauline leaves palmatipartite-palmatisect, 3-10 × 3-12 cm, orbicular, truncate at the base; 5-6-lobed, lobes 0.5-10 × 0.3-2 cm, oblanceolate, oblong. Petiole 2-15 cm. Stipule 3-5-fid, 2-5 mm; lobes lanceolate, margin entire, apex acuminate, stellate hairy. Floral leaves palmatipartite-palmatisect, 1.5-10 × 2.5-12 cm, orbicular, truncate at the base, cuneate; 3-5-lobed, lobes 0.4-8 × 0.3-2 cm, oblanceolate, oblong. Petiole 2-12 cm. Stipule simple, sometimes caducous, 1-3 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Inflorescence raceme, single flower or 2-3 flowered fascicles in the leaf axils. Pedicels 5-30 mm, glabrous-stellate hairy. Epicalyx 6-9, connate at the base; lobes 1-10 × 1-7 mm, lanceolate, margin entire, apex acuminate, obtuse, stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, striate, 10-20 × 4-7 mm, lanceolate, margin entire, apex obtuse, acuminate, stellate hairy. Petals 5, dark pink-white, yellowish at the base, 2.5-5.5 × 1-3.5 cm, margin entire, apex entire, slightly undulate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical or angular, 2-8 mm, glabrous. Stylus divided toward the apex. Mericarps

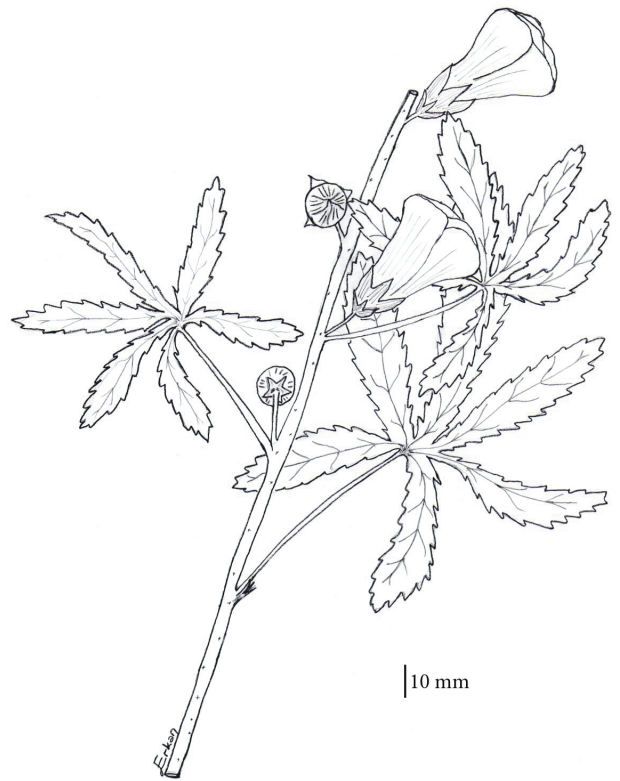


Figure 15. Habitus of *Alcea dissecta*.

3.5-7 × 4-8 mm, reniform-orbicular, straw-brown, clearly winged, stellate-pilose hairy. Seeds 1-2 × 2.5-4.5 mm, reniform, brown, tuberculate, around hilum glabrous or white pilose hairy.

Fl. 7-8, Fr. 8-9, Habitat: roadside, calcareous, fields. 400-1600 m.

Examined specimens: Turkey, B7 Tunceli: Pülümür, 1300 m, 11.07.1957, *P.H.Davis* & *I. Hedge* 30937 (ANK); Ovacık, 1400 m, 21.07.1957, *P.H.Davis* & *I. Hedge* 31456 (ANK); Ovacık-Tunceli, 30 km, Ovacık valley, 18.07.2000, roadside, *G.Yılmaz* 111 (AEF); Elazığ: Elazığ-Bingöl, 40 km to Bingöl, 1590 m, 16.08.2005, calcareous, *E.Uzunhisarcıklı* 2098 (GAZI); B8 Bingöl: Haşmet village, 30.06.1956, *N.Zeybek s.n.* (ISTE 16156); C6 Gaziantep: Gaziantep-Nizip, 13-15 km, 700-750 m, 11.06.2004, roadside, *E.Uzunhisarcıklı* 1940 (GAZI); C7 Diyarbakır: Diyarbakır-Elazığ, 33 km from Diyarbakır, 08.06.1971, fields, *A.Baytop s.n.* (ISTE 20126); Şanlıurfa: Urfa-Viranşehir, Çobanboğazı, 38 km, 480 m, 12.06.2004, roadside, *E.Uzunhisarcıklı* 1945 (GAZI).

Distribution: Turkey, Palestine, NW Iran. Irano-Turanian element.

14. *Alcea excubita* Iljin, Zametki Sist. Geogr. Rast. 15: 43 (1949) (Figure 16).

Type: [Turkey, A8 Çoruh] distr. Artvin, *Turkewicz* 716 (E!).

Perennial, plant 30-50 cm, erect, branched at the base or unbranched. Stem 2-7 mm diam., cylindrical, densely stellate-pilose hairy. Leaves palmatipartite-palmatisect, orbicular, apex obtuse, upper surface sparsely, lower surface densely stellate-pilose hairy. Basal leaves 2-6 × 2.5-6.5 cm, cordate, truncate at the base, margin crenate; 5-lobed, lobes 5-40 × 5-25 mm, oblong-ob lanceolate. Petiole 6-12 cm, stellate-pilose hairy. Stipule simple or 2-fid, 2-3 mm; lobes oblong-lanceolate, margin entire, apex obtuse, stellate-pilose hairy. Cauline leaves 2-6 × 3-7 cm, truncate, cordate at the base, margin crenate-serrate; 3-5-lobed, lobes 0.5-5.5 × 0.5-2 cm, oblong-ob lanceolate. Petiole 1.5-10 cm, stellate-pilose hairy. Stipule simple or 2-fid, 1-3 mm; lobes lanceolate, margin entire, apex acuminate, stellate-pilose hairy. Floral leaves 0.7-3 × 0.8-3 cm, truncate, cordate, cuneate at the base, margin crenate-serrate; 3-5-lobed, lobes 3-25 × 2-15 mm, oblong-ob lanceolate. Petiole 0.2-3 cm, densely stellate-pilose hairy. Stipule simple or 2-fid, 1-2.5 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate-pilose hairy. Inflorescence raceme, single flower in the leaf axils. Pedicels 6-25 mm, stellate hairy. Epicalyx 5-6, connate at the base; lobes 1-5 × 1-4 mm, lanceolate, margin entire, apex acuminate, densely stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, sometimes striate, 10-15 × 4-5 mm, lanceolate, margin entire, apex obtuse, densely stellate-pilose hairy. Petals 5, white-canary, 2-5.5 × 0.8-3 cm, margin entire, apex entire or slightly undulate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube 2-5 mm, glabrous, angular or cylindrical. Stylus divided toward the apex. Mericarps 4-5 × 3-5 mm, orbicular, straw-brown, clearly winged, rugose, furrows stellate-pilose hairy, sparsely hairy on lateral side. Seeds 1.5-2 × 2-3 mm, reniform, brown, slightly tuberculate, sparsely white pilose hairy around hilum.

Fl. 6-8, Fr. 7-9, Habitat: roadside, calcareous, stony slopes. 600-1800 m.



Figure 16. Habitus of *Alcea excubita*.

Examined specimens: Turkey, A9 Artvin: Artvin-Ardanuç, 10-15 km, 600 m, 17.08.2004, roadside, stony slopes, 41°09'28"N, 41°57'02"E, *E.Uzunhisarcıklı* 2013 (GAZI); between Artvin and Ardanuç, 600 m, rock igneous slopes, 26.06.1957, *P.H.Davis* 30052 (E); B7 Erzincan: Kemaliye, Rabat river, 860 m, 03.07.2007, stony slopes, *U.Özbek* 2522 (GAZI); Kemaliye, Sırakonaklar village, 900 m, 12.07.2005, stony slopes, *E.Uzunhisarcıklı* 2088 (GAZI); Malatya: Malatya-Yazıhan, 13 km to Yazıhan, 720 m, 12.07.2005, roadside, *E.Uzunhisarcıklı* 2086 (GAZI).

Distribution: Turkey, N Iran. Irano-Turanian element.

Alcea excubita is close to *Alcea dissecta*. These species possessing stem and leaves covered with dense stellate-pilose hairs and hairy mericarps on the dorsal side can be easily identified. *Alcea excubita*, known to be found in Artvin and Malatya, with some living area less than 20 km² away (criterion D2), has been suggested to be classified in the VU category (IUCN, 2010).

15. *Alcea flavovirens* (Boiss. & Buhse) Iljin, Fl. URSS 15: 100 (1949). (Figure 17).

= *Althaea flavovirens* Boiss. & Buhse, Nouv. Mem. Soc. Imp. Naturalistes Moscou 12: 44 (1860).

= *Althaea tabrisiana* Boiss. & Buhse, Nouv. Mem. Soc. Imp. Naturalistes Moscou 12: 44 (1860).

Type: [Iran] bei Dschulf und zwischen dem Araxes und Tabris (florens), um Kardagh, Zwischen Iri und Alliar (fructifera) 1847, *Buhse* 455.

Perennial, plant 30-150 cm, erect, branched at the base. Stem 2-10 mm diam., cylindrical, glabrous or rarely sparsely stellate hairy. Basal leaves palmatilobate, 8-12 × 10-15 cm, orbicular, cordate at the base, margin crenate, apex obtuse, sparsely stellate hairy; inconspicuously lobed. Petiole 10-20 cm, sparsely stellate hairy. Stipule absent. Cauline leaves palmatilobate-palmatifid, 4-10 × 5-13 cm, orbicular, cordate, truncate at the base, margin crenate, apex obtuse, sparsely stellate hairy; 3-5-lobed, lobes 0.5-5 × 0.8-6 cm, oblong. Petiole 3-10 cm, sparsely stellate hairy. Stipule absent or 2-fid, 4-9 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Floral leaves palmatilobate-palmatifid, 1-5 × 1.5-5 cm, orbicular, lanceolate, truncate, cordate at the base, margin crenate, apex obtuse, sparsely stellate hairy; 3-5-lobed, lobes 0.5-2 × 0.7-2.2 cm, oblong-lanceolate. Petiole 0.2-3 cm, stellate hairy. Stipule absent or 2-4-fid, 3-6 mm; lobes linear-lanceolate, margin entire, apex acuminate, stellate hairy. Inflorescence raceme, single or rarely 2 flower in the leaf axils. Pedicels 2-10 mm, densely stellate hairy. Epicalyx 5-8, connate at the base; lobes 2-6 × 1-4 mm, lanceolate, margin entire, apex acuminate, obtuse, densely stellate hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, conspicuously striate, 10-20 × 4-6 mm, lanceolate, margin entire, apex obtuse, acuminate, densely stellate hairy. Petals 5, yellow, greenish at the base, 3-5 × 1.5-3 cm, margin entire, apex entire or emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 1-4 mm, glabrous. Stylus divided toward the apex. Mericarps 4-5 × 4-5 mm, orbicular, brown, clearly winged, furrows stellate, pilose hairy on lateral side. Seeds 1.5-2 × 3-3.5 mm, reniform, brown, glabrous or slightly tuberculate, pilose hairy around hilum.



Figure 17. Habitus of *Alcea flavovirens*.

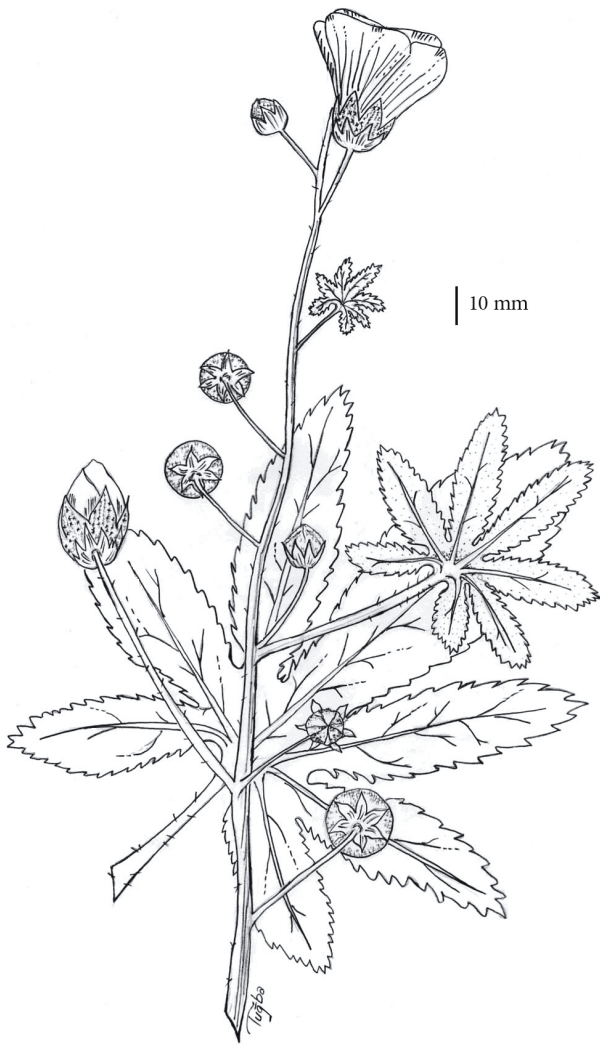
Fl. 7, Fr. 8-9, Habitat: stony slopes, volcanic lands. 1400-1500 m.

Examined specimens: Turkey, B9 Van: Van, 15.07.1970, *A. Güneysu s.n.* (ISTE 55204); B10 Iğdır: Iğdır-Doğubeyazıt, 25-30 km, 1400-1450 m, 30.07.2006, volcanic lands, *E. Uzunhisarcıklı* 2212 (GAZI); C10 Hakkari: Hakkari-Van, 40 km, 1500 m, 16.07.2001, stony slopes, *Z. Aytaç* 8209 (GAZI).

Distribution: Turkey, N and NW Iran. Irano-Turanian element.

Alcea flavovirens is similar to *Alcea hohenackeri*, but these species are distinguished by the former's glabrous or rarely sparsely stellate hairy stem and epicalyx length less than half of its sepal's length. *Alcea flavovirens* had been placed in the DD category (Ekim et al., 2000). This species was collected from Hakkari by Z. Aytaç et al.; therefore, it has been proposed as CR (Aytaç et al., 2005).

16. *Alcea fasciculiflora* Zohary, Israel J. Bot. 12: 20 (1963). (Figure 18).

Figure 18. Habitus of *Alcea fasciculiflora*.

Type: Turkey, prov. Siirt [B8] Silvan to Kurtalan, 1957, *Davis* 22177 (holo. E!). "Kurdistan", sine loc. Sint. 1888:1908b.

Perennial, plant 50-220 cm, erect, branched at the base. Stem 5-15 mm diam., cylindrical-angular, glabrous, sometimes sparsely simple hairy. Basal leaves palmatifid-palmatipartite, 5-11 × 6-18 cm, orbicular, cordate at the base, margin serrate-crenate, apex obtuse, acute, sparsely stellate-pilose hairy; 5-7-lobed, lobes 3-8 × 1-4.5 cm, elliptic, oblong, oblanceolate. Petiole 4-20 cm, glabrous or sparsely simple hairy. Stipule simple, 2.5-6 mm, lanceolate, margin entire, apex acuminate, pilose hairy. Cauline leaves palmatipartite-palmatisect, 2.5-9 × 2.5-12 cm, orbicular, cordate at the base, margin serrate-

crenate, apex obtuse, acute, upper surface glabrous or sparsely stellate hairy, lower surface densely stellate hairy; 5-7-lobed, lobes 1.5-7 × 0.6-2 cm, oblanceolate, oblong. Petiole 1.5-6 cm, stellate-pilose hairy. Stipule simple, 2-5 mm, lanceolate, margin entire, apex acuminate, white pilose hairy. Floral leaves palmatifid-palmatipartite, 1-10 × 0.4-4 cm, orbicular, cordate at the base, margin serrate-crenate, apex obtuse, acute, stellate-pilose hairy; 3-5-lobed, lobes 0.5-8 × 0.1-2 cm, oblanceolate, oblong. Petiole 0.4-9 cm, stellate-pilose hairy. Stipule absent or 2-5 mm, lanceolate, margin entire, apex acuminate, pilose hairy. Inflorescence raceme, single flower or 2-3 flowered fascicles in the leaf axils. Pedicels 1-8 cm, glabrous, sparsely to densely stellate-pilose hairy. Epicalyx 6-8, connate at the base; lobes 5-10 × 2-5 mm, lanceolate, oblong, margin entire, apex acuminate, obtuse, stellate-pilose hairy. Epicalyx less than ½ as long as calyx. Sepals 5, connate at the base, striate, 15-25 × 5-10 mm, lanceolate, margin entire, apex obtuse, acuminate, stellate-pilose hairy. Petals 5, pink, 2.5-5.5 × 1-3.5 cm, margin entire, apex entire, slightly undulate or conspicuously emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, yellow; filaments dorsifixed, glabrous. Staminal tube cylindrical, 3-5 mm, glabrous. Stylus divided toward the apex. Mericarps 4-5.5 × 4-6.5 mm, reniform, straw, clearly winged, furrows tomentose, pilose hairy, sparsely hairy on lateral side. Seeds 1.5-2.5 × 2-3.5 mm, reniform, brown, conspicuously tuberculate or not, white pilose hairy around hilum.

Fl. 6-7, Fr. 7-8, Habitat: steppe, roadsides. 680 m.

Examined specimens: Turkey, B8 Diyarbakır: Kozluk-Bitlis, 3 km, 680 m, 10.07.2005, roadsides, *E.Uzunhisarcıklı* 2078 (GAZI); Siirt: Silvan-Kurtalan, 24.06.1954, *P.H.Davis* 22177 (iso. ANK).

Distribution: Turkey, Iraq. Irano-Turanian element.

Alcea fasciculiflora is distinguished easily from other *Alcea* species by its particularly long peduncles. *Alcea fasciculiflora* has the same changes in the threat category (from DD to CR); it represents a number of specimens in the population of less than 50, criterion D (IUCN, 2010). This species is just known from the type locality in Turkey and also a record from Iraq.

* *Alcea rosea* L. Sp. Pl. (1753).

≡ *Althaea rosea* (L.) Cav. Diss. 2: t. 91 (1786).

= *A. sinensis* Cav. Diss. 2: t. 29 (1786).

= *A. meonantha* Link Linnaea 9: 586 (1834).

= *A. cretica* Weinm., Syll. Pl. Nov. 2: 171 (1828).

Type: Described from cultivated specimens.

Perennial, plant 100-250 cm, erect, branched at the base. Stem 5-25 mm diam., cylindrical-angular, sparsely to densely stellate, pilose, tomentose, hirsute, fasciculate hairy or glabrous. Leaves palmatilobed-palmatisect, ovate-orbicular, cordate, margin dentate-crenate, 5-7-lobed, glabrous or hairy. Petiole distinctly long. Inflorescence raceme, single flower or 2-3 flowered fascicles in the leaf axils. Pedicels 1-3 cm. Epicalyx 6-8, connate at the base. Epicalyx less or more than ½ as long as calyx. Sepals 5, connate at the base, striate or not, triangular, lanceolate, margin entire, apex obtuse, acuminate, densely tomentose or stellate-pilose hairy. Petals 5, sometimes imbricate, pink, blackish red, purple, lilac, white or yellow, margin entire, apex entire, slightly undulate or conspicuously emarginate, white pilose hairy at the connate part. Stamens numerous, anthers yellow. Staminal tube cylindrical, 2-7 mm, glabrous. Stylus divided toward the apex. Mericarps 4-8 × 3.5-7 mm, reniform, straw, clearly winged, furrows densely. Seeds 1.5-2.5 × 2-3.5 mm, reniform, brown, conspicuously tuberculate or not, white pilose hairy around hilum.

Fl. 6-7, Fr. 7-8.

Examined specimens: Turkey, B3 Eskişehir: Dağköplü-Kozlu, 950 m, 30.07.2003, *E.Uzunhisarcıklı* 1917 (GAZI); B5 Kayseri: Karadere, 1000-1100 m, 25.07.2003, *E.Uzunhisarcıklı* 1908a (GAZI); C3 Antalya: Perge, 20 m, 08.07.2004, *E.Uzunhisarcıklı* 1989a (GAZI); C4 Konya: Kazımkarabekir-Karaman, 20 km to Karaman, 1035 m, 07.07.2005, *E.Uzunhisarcıklı* 2047 (GAZI).

Doubtful taxon: *Alcea lavateriflora* (DC.) Boiss., Fl. Orient. 1: 828 (1867).

≡ *Althaea lavateriflora* DC., Prodr. 1: 437 (1824).

= *Althaea pontica* sensu Hayek, Prodr. 1: 551 (1925) non Janka.

Type: prope Seyde ad radices Libani.

Taxonomic results using the description of *Alcea lavateriflora* indicate that this species could be close to *Alcea apterocarpa*. There is no specimen belonging to this species through the recorded localities. The only difference between these species is winged or wingless mericarps. There is a high possibility of making a mistake while determining a specimen's class using young mericarps. Therefore, using a mature fruit is very important for correct classification. According to this characteristic feature, some specimens belonging to *Alcea apterocarpa* have been indicated. In recent years, in spite of field trips throughout Turkey, this species has not been collected. As a result, we suggest introducing this species as a doubtfully recorded taxon until an inclusive collection within the borders in future.

Taxonomic treatment of *Althaea*

Perennial or annual, 4-200 cm, branched or unbranched, erect or ascending. Stem 0.2-1.5 cm diam., cylindrical, stellate hairy. Leaves entire-palmatisect, orbicular, orbicular-triangular, cordate-orbicular, ovate, ovate-triangular, cuneate, truncate, obtuse, cordate at the base, margin serrate, irregular teeth, crenate, crenate-serrate, apex obtuse; acuminate, acute, 3-lobed or 3-5-lobed, sometimes inconspicuously lobed. Petiole 0.2-8 cm, stellate, hirsute, velvety stellate hairy. Stipule simple or 2-3-fid, 1-10 mm, stellate, hirsute or pilose hairy. Flowers in the leaf axils or were collected at peduncle. Pedicels 0.1-16 cm, stellate, hirsute, velvety stellate hairy. Epicalyx 6-12, connate at the base; stellate, hirsute, velvety stellate hairy. Epicalyx ½ as long as calyx or more than ½ as long as calyx. Sepals 5, connate at the base. Petals 5, lilac-purple, white-pinkish, 6-23 mm, margin entire, apex entire, retuse or emarginate, junctions at the base white pilose hairy. Stamens numerous, anthers reniform, purple, purplish-brown; filaments were connected to the dorsal side. Staminal tube cylindrical, 0.1-6 mm. Mericarps reniform, orbicular, wingless, stellate-pubescent, stellate-pilose hairy or glabrous. Seeds reniform, orbicular, brown, glabrous.

Key to the Turkish species of *Althaea*

1- Perennial, stellate, velvety stellate hairy, stem to 15 mm diam.

2- Cauline leaves palmatifid-palmatisect, 5-lobed

- 3- Peduncles 2-3-flowered, mericarps glabrous 1. **cannabina**
- 3- Peduncles numerous flowered, mericarps stellate-pubescent 2. **armeniaca**
- 2- Cauline leaves palmatilobate, 3-lobed 3. **officinalis**
- 1- Annual, entirely hispid-hirsute, stem not exceeding 5 mm diam 4. **hirsuta**

1. ***Althaea cannabina*** L., Sp. Pl. 686 (1753). (Figure 19).

= *Althaea kotschy* Boiss., Diagn. Pl. Orient. 2 (1): 102 (1853)

Type: Described from Hungary, Italy, and S France (photo. Hb. Linn. 868/2!).

Perennial, 40-150 cm, erect and branched above. Stem 1-15 mm diam., cylindrical, hirsute, stellate, velvety stellate hairy. Leaves orbicular-triangular, petiole and stipule stellate hairy. Basal leaves palmatifid-palmatisect, 3-12 × 2-16 cm, cuneate, truncate at the base, margin serrate or irregular teeth, apex acuminate; 5-lobed, lobes 3-10 × 1-6 cm, elliptic-lanceolate. Petiole 2-8 cm. Stipule simple or 3-fid, 2-8 mm, linear-oblong, margin entire or teeth, apex acuminate. Cauline leaves palmatifid-palmatisect, 2.5-9 × 2-14 cm, cuneate at the base, margin serrate to irregular teeth, apex obtuse; 5-lobed, lobes 2-8.5 × 0.5-4 cm, elliptic-lanceolate. Petiole 1.5-6 cm. Stipule simple or 3-fid, 2.5-7 mm, linear-oblong, margin entire or teeth, apex acuminate. Floral leaves palmatisect, 1-4.5 × 0.5-6 cm, cuneate at the base, margin serrate, apex acuminate; 3-5-lobed, lobes 0.2-5 × 0.1-1 cm, the middle lobe larger than others, elliptic-lanceolate. Petiole 0.2-2 cm. Stipule 3-fid, 1-5 mm, linear, margin teeth, apex obtuse. Flowers solitary or peduncles 2-3-flowered. Peduncle 1-15 cm. Pedicels 0.5-16 cm, densely stellate hairy. Epicalyx 7-9, connate at the base; lobes 2.5-5 × 0.1-0.5 mm, lanceolate, margin entire, apex acuminate, densely stellate hairy. Epicalyx more than ½ as long as calyx or ½ as long as calyx. Sepals 5, connate at the base, 5-7 × 3-4 mm, ovate, margin entire, apex obtuse, acuminate, apiculate, densely stellate hairy. Petals 5, pink-purple, 10-23 × 5-12 mm, margin entire, apex entire or retuse, white pilose hairy at the connate part. Stamens numerous, anthers reniform, purplish-brown; filaments dorsifixed, papillose



Figure 19. Habitus of *Althaea cannabina*.

hairy. Staminal tube cylindrical, 0.5-6 mm, glabrous or sparsely papillose hairy. Stylus divided toward the apex. Mericarps 2.5-4 × 2-3.5 mm, reniform, wingless, striate, rugose, brown, glabrous. Seeds 0.5-2.5 × 0.5-3 mm, reniform, brown, glabrous.

Fl. 6-8, Fr. 7-9, Habitat: steppe, roadsides, marshy ground, wetlands, fields, maquis, river banks, vineyards, meadows. s.l.-1800 m.

Examined specimens: Turkey, A1 Edirne: Enez, Hasköy-Abdurrahim village, c. 400 m, plantation area, *Quercus* forest, 21.08.1999, A.A.Dönmez 7085 (HUB); Edirne-Karaağaç, 31.07.1983, A.Baytop

s.n. (ISTE 517); Tekirdağ: Yeniköy-Uçmakdere, Ayvazdere, 17.07.1974, *N. & E. Özhatay s.n.* (ISTE 30441); Tekirdağ-Hayranbolu, 17 km from Tekirdağ, 15.07.1971, river banks, *A. Baytop s.n.* (ISTE 20626); A2 Bursa: Bursa plateau, river banks, 120 m, 27.07.1945, *B. Kasaplıgil s.n.* (ANK); Uludağ (Teferrüç, Bakacık), 06.09.1944, *A. Heilbronn s.n.* (ISTF 4726, 4736); Uludağ (İnkaya), 01.09.1944, *A. Heilbronn s.n.* (ISTF 4714); Maskara road, 20.08.1942, *A. Mete s.n.* (ISTF 2059); Mustafa Kemal Paşa, 07.07.1973, *E. Tuzlacı s.n.* (ISTE 26245); İstanbul: Tuzla, 06.07.1945, *A. Heilbronn & M. Başarman s.n.* (ISTF 5363); E of Güzelceköy, 11.09.1970, wetland, *A. Baytop, G. Ertem, N. Özocak, F. Öktem s.n.* (ISTE 18511); W of Çatalca train station, 25.07.1972, river banks, *N. Özhatay & E. Özhatay s.n.* (ISTE 23006); Haramidere, 28.07.1967, *A. Baytop, G. Atilla s.n.* (ISTE 11547); Kocaeli: Darıca, Yelkenkaya, Çakıl, 07.07.1974, *G. Dökmeci s.n.* (ISTE 30284); A4 Kastamonu: Yenice, Kavaklı, 800 m, 08.08.1984, *M. Demirörs* 1705 (ANK); Çankırı: Eldivan, Karadere, vineyards, 950-1050 m, 21.07.1984, *Ş. Yıldırım* 6837 (HUB); *ibid.*, *Ş. Yıldırım* 6790 (HUB); *ibid.*, *Ş. Yıldırım* 6935 (HUB); *ibid.*, 1300-1800 m, 21.08.1985, *Ş. Yıldırım s.n.* (HUB); A5 Kastamonu: Tosya, *Bornm.* 1890: 1761a (E); A6 Amasya: Çiğdemlik village, Kayabaşı plateau, ca. 1050 m, edge of fields, 02.08.1987, *S. Peker* 1653 (GAZI); around train tracks, 16.07.1956, *T. Baytop s.n.* (ISTE 4674); Tokat: Reşadiye, Çambalı village, Çaylılar, 25.08.1974, *S. Şahin s.n.* (ISTE 30906); A8 Artvin: Yusufeli-Olur, Arpacık village, 29.07.2006, 820 m, roadside, *E. Uzunhisarcıklı* 2199 (GAZI); B1 Manisa: Soma, Yağcılı village, 390 m, 25.07.1982, *G. Çakırer s.n.* (ISTE 49527); Balıkesir: Yeşilhisar, Neşederesi, Savaştepe, 26.07.1982, *G. Çakırer s.n.* (ISTE 49604); B3 Konya: Akşehir, Sultan D., around Kozağaç, 1280 m, 30.09.1976, *G. Dökmeci s.n.* (ISTE 36140); *ibid.*, above Topyeri, 09.07.1975, *G. Dökmeci s.n.* (ISTE 32793); *ibid.*, around Vahapgazi (Kesikbaş), 1050 m, 08.07.1975, *G. Dökmeci s.n.* (ISTE 32775); B4 Ankara: Hacıkadın river, 08.07.1942, *H. Bağda* 503 (ANK); Beynam forest, Karanlık river, 1200 m, 07.10.1945, *B. Kasaplıgil s.n.* (ANK); Keçiören, Hacıkadın river, maquis, 900 m, 13.10.1945, *B. Kasaplıgil s.n.* (ANK); Dikmen, Keklikpınarı, 900 m, 04.10.1992, *A.A. Dönmez* 3004 (HUB); Beştepe, 900 m, 04.07.1995, steppe, *M. Vural* 7396 (GAZI); B5 Kayseri: Ali Dağı, Haymana, 1000 m, 03.07.2004,

roadside, *E. Uzunhisarcıklı* 1983 (GAZI); B7 Malatya: Arapgir-Kemaliye, 1 km, 910 m, 12.07.2005, roadside, 39°04'13"N 38°30'34"E, *E. Uzunhisarcıklı* 2089 (GAZI); C2 Muğla: Köyceğiz, Köyceğiz village, wetlands, 20 m, 06.09.1991, *A. Güner* 10259 (GAZI); Denizli: Tekke village, c. 5 km S of Denizli, alt. 500 m, *Pinus brutia* wood on steep slope, 26.07.1981, *A. Kurtto* 3331 (EGE); Honaz-Menteş village, 620 m, 24.09.1973, field, *E. Tuzlacı s.n.* (ISTE 23547); C3 Konya: Akşehir-Gelendost, 5 km to Gelendost, 945 m, 08.07.2004, edge of garden, 38°07'551"N 31°01'866"E, *E. Uzunhisarcıklı* 1986 (GAZI); Antalya: Kemer, Kesmeboğaz, Tehnelli, *Pinus brutia* forest, 400 m, 29.07.1980, *H. Peşmen* 4909 (ANK); Termessus, 19.07.1949, *A. Attila s.n.* (ISTF 9070); C4 Konya: Ermenek village, Göktepe, Dumlugöz (Muz valley) village, 950-1300 m, 13.09.1983, *H. Sümbül* 2447 (HUB); C5 Adana: Çardak-Yarpuz, 300-500 m, 23.06.2004, maquis, *E. Uzunhisarcıklı* 1975 (GAZI); Konya: Ereğli, Aydos D., Halkapınar, river banks, 1300 m, 15.07.1977, *S. Erik* 2577 (HUB); Niğde: Ulukışla, Çiftehan, Horozköy, vineyards, 1200-1350 m, 30.07.1984, *Ş. Yıldırım* 7135 (HUB); C6 Hatay: Erzin, Tekgöz plateau, Pınarbaşı, Amanos D., 1000 m, 23.09.1967, *Y. Akman* 7907 (ANK); Antakya-Samandağı, Küçükaraçay village, 120-150 m, 27.06.1993, *Z. Aytaç* 5982 (GAZI); K. maraş: Göksun, Höbek D., above Döngel Mağarası, 900 m, 21.07.1977, *B. Yıldız* 1446 (HUB).

Distribution: Turkey, Europe, S. Russia, Caucasia, N and NW Iran, Turkistan. Widespread.

Althaea cannabina is distinguishable by its glabrous mericarps, denticulate palmatifid-palmatisect leaves, and fewer flowers on the peduncles. This species has been placed in LC, and is considered a widespread species in Turkey (IUCN, 2010).

2. *Althaea armeniaca* Ten., Index Seminum (NAP) 1837: 1 1837. (Figure 20).

= *A. micrantha* Wiesb. ex Borb., Oesterr. Bot.-Zeitschr. XLIII (1893).

Perennial, 40-200 cm, erect and branched above. Stem 0.2-1.5 cm diam., cylindrical, lower part sparsely stellate hairy, upper part velvety stellate hairy. All leaves palmatifid-palmatipartite, stellate hairy; stipules simple, 2-5 mm, linear, white pilose hairy. Basal leaves 5-7 × 6-8 cm, orbicular, truncate,

Figure 20. Habitus of *Althaea armeniaca*.

obtuse at the base, margin serrate, apex obtuse, acute; 5-lobed, lobes $0.7-5 \times 0.8-3.5$ cm, lanceolate. Petiole 4-6 cm, stellate hairy. Cauline leaves $1.5-8 \times 1.5-9$ cm, orbicular, truncate, obtuse at the base, margin irregular serrate, apex obtuse; 5-lobed, lobes $0.5-4 \times 0.3-3$ cm, lanceolate. Petiole 0.5-5 cm, stellate hairy. Floral leaves $1-6 \times 0.6-5$ cm, orbicular-triangular, cuneate, truncate at the base, margin serrate, apex obtuse, acuminate; 3-5-lobed, $0.3-4 \times 0.2-2$ cm, the middle lobe larger than the others, lanceolate. Petiole 0.2-2 cm, 1-4 flowered fascicles in the leaf axils or peduncles multiflorous. Peduncles 0.5-3 cm. Pedicels 0.1-5 cm, densely stellate hairy. Epicalyx 6-10, connate

at the base; lobes $2-6 \times 0.5-2$ mm, linear-lanceolate, margin entire, apex acuminate, densely stellate hairy. Epicalyx more than $\frac{1}{2}$ as long as calyx. Sepals 5, connate at the base, $8-10 \times 2-5$ mm, lanceolate, margin entire, apex acuminate, stellate hairy. Petals 5, lilac-purple, $9-15 \times 4-6$ mm, margin entire, apex obtuse or retuse, white pilose hairy at the connate part. Stamens numerous, anthers oblong, reniform, purple; filaments dorsifixed, glabrous. Staminal tube cylindrical, 1-3 mm, glabrous or rarely sparsely papillose hairy. Mericarps $2-3 \times 1.5-3$ mm, orbicular, wingless, rugose, brown, stellate-pilose hairy, lateral glabrous. Seeds $1-2 \times 2-2.5$ mm, reniform, orbicular, brown, glabrous.

Fl. 7-8, Fr. 8-9, Habitat: river banks, meadows, fields, vineyards. 1173-1500 m.

Examined specimens: Turkey, A5 Kastamonu: Tosya-Osmancık, 30-35 km, 24.07.2006, 382 m, edge of field, *E. Uzunhisarcıklı* 2194 (GAZI); A8 Erzurum: Şenkaya, Penek village, 1173 m, 19.08.2005, river banks, meadows, *E. Uzunhisarcıklı* 2114 (GAZI); ibid., 1500 m, 01.09.1993, meadows, *Y. Altan* 5615 (GAZI); Artvin: Yusufeli-Olur, Arpacık village, 29.07.2006, 550-600 m, vineyards, *E. Uzunhisarcıklı* 2204 (GAZI); A9 Iğdır: Aralık-Karakoyunlu, 500 m to Karakoyunlu, 30.07.2006, 900 m, river banks, *E. Uzunhisarcıklı* 2211 (GAZI); B7 Erzincan: Kemah, Muratboynu-Yücebelen village, 1100 m, 31.07.1996, *A. A. Dönmez* 5348 (HUB).

Distribution: Turkey, S Russia, Caucasus, N Iran, Turkistan. Irano-Turanian element.

Althaea armeniaca morphologically is similar to *Althaea officinalis*; the feature of cauline leaves is considered the most important difference between them: 1) the lobe number of cauline leaves in *Althaea armeniaca* is 5, whereas it is often 3 in *Althaea officinalis*, 2) leaf shape is palmatifid-palmatifidpartite in *Althaea armeniaca* and palmatilobed in *Althaea officinalis*. *Althaea armeniaca* is recorded in the *Flora of Turkey* with 2 collections. There are some records belonging to *Flora of Russia*. By excursions around North Anatolia (Erzurum, Kars) some collected specimens attributed to this species have been indicated, living in an area of 20 km² (criterion D2). Therefore, it has been included in the VU category (IUCN, 2010).

3. *Althaea officinalis* L., Sp. Pl. 686 (1753). Ic: Bonnier, Fl. Comp. Fr., Suisse et Belge 2: t. 97 (1912). (Figure 21).

Type: Described from Holland, Britain, France, and Siberia (photo. Hb. Linn. 868/1!).

Perennial, 60-200 cm, erect, branched above or unbranched. Stem 0.2-1.2 cm diam., cylindrical, below sparsely stellate hairy or glabrous, above densely velvety stellate hairy. All leaves entire-palmatilobate, under surface densely, upper surface sparsely velvety stellate hairy. Stipules simple, 2-3 mm, linear-lanceolate, usually caducous, densely stellate hairy. Basal leaves 4-9 × 4-10 cm, ovate, truncate at the base, margin crenate, apex obtuse. Petiole 4-6 cm, densely stellate hairy. Cauline leaves 2-10 × 2.5-8 cm, ovate-triangular, truncate, cuneate at the base, margin crenate-serrate, apex obtuse, acuminate; 3-lobed, inconspicuously lobed. Petiole 1-5 cm, densely velvety stellate hairy. Floral leaves 1.5-8 × 0.5-4 cm, ovate-triangular, cuneate, obtuse at the base, margin crenate-serrate, apex obtuse, acuminate; 3-lobed, inconspicuously lobed. Petiole 0.3-3 cm, stellate hairy. 2-4 flowered fascicles in the leaf axils. Peduncles 0.5-4 cm. Pedicels 0.5-3 cm, densely velvety stellate hairy. Epicalyx 8-12, connate at the base; lobes 2-6 × 1-2 mm, linear-lanceolate, margin entire, apex acuminate, densely velvety stellate hairy. Epicalyx ± ½ as long as calyx. Sepals 5, connate at the base, 6-12 × 2-5 mm, ovate-triangular, margin entire, apex acuminate, obtuse, densely velvety stellate hairy. Petals 5, white-pinkish, 7.5-15 × 6-13 mm, margin entire, apex entire, emarginate, white pilose hairy at the connate part. Stamens numerous, anthers oblong, reniform, purple; filaments dorsifixed, sparsely papillose hairy. Staminal tube cylindrical, 3-5 mm, glabrous or rarely sparsely papillose hairy. Mericarps 1.5-2.5 × 2-3 mm, orbicular, reniform, wingless, rugose, brown, densely stellate-pilose hairy, sparsely papillose hairy on lateral side. Seeds 1.5-2 × 1-1.5 mm, reniform, brown, glabrous.

Fl. 6-9, Fr. 7-10, Habitat: roadsides, meadows, river banks, wetlands, fields, marshy ground, rocky slopes, open area of forest, serpentine slopes. s.l.-2100 m.

Examined specimens: Turkey, A1 Edirne: around İpsala Gümrük Kapısı, river banks, c. 100



Figure 21. Habitus of *Althaea officinalis*.

m, 17.07.1999, wetlands, A.A.Dönmez 7246 (GAZI, HUB); Kırklareli: İğneada-Liman, 29.07.1974, roadside, N.&E.Özhatay s.n. (HUB, herb. no. 30696); ibid., Erikli lake, 23.07.2006, 362 m, open area of mixed forest, E.Uzunhisarcıklı 2191 (GAZI); Tekirdağ: Malkara-Tekirdağ, 30 km, 22.07.2006, 165 m, field, E.Uzunhisarcıklı 2189 (GAZI); A2 Bursa: Apolyont lake, Çingene Çeşmesi, Sulu river, 70 m, 28.07.1961, K.Karamanoğlu 585 (ANK); İstanbul: Kartal, Tuzla, 06.07.1945, A.Heilbronn & M.Başarman s.n. (ISTE 5364); Bakırköy, Küçükçekmece, 07.1943, M.Başarman s.n. (ISTE 2495); A4 Kırıkkale: Sulakyurt, Çatalelma village, edge of Kızılırmak, 800 m, 10.08.1989, A.A.Dönmez 1593 (HUB); A5 Samsun: Balık G. nr. Bafra,

P.H.Davis 24977 (BM); Amasya: Tersakan valley, 16.06.1954, *R. Çetik* 368 (KNYA); Bafra, Balıklı lake, 11.08.1984, *Ö.Seçmen*, *Y.Gemici*, *H.Tabata&Yasuda s.n.* (EGE 28719); A8 Erzurum: W of Tercan, 1500 m, 11.07.1957, *P.H.Davis & I.Hedge* 30947 (ANK, BM); A9 Kars: 7-10 km from Karakurt to Kağızman, Aras valley, 1400 m, 14.07.1979, *O.Güneş* 1353 (HUB); B1 Balıkesir: Edremit, Örentepe, 06.07.1969, *N.Zeybek s.n.* (EGE 11564); B3 Afyon: rocky slopes, 13.07.1954, *H.Birand* 5007 (ANK); Çay, Eber lake, *Phragmites* sp. society, 960 m, 10.08.1992, *A.A.Dönmez* 2945 (HUB); ibid., 09.07.1989, salty meadows, *S.Erik* 4020 (HUB); Dazkırı-Çardak, Devrent, ca. 800 m, 27.07.1984, marshy ground, *Z.Aytaç* 1618 (GAZI); Konya: Akşehir, SW of Akşehir lake (Yeniköy), 1050 m, around lake, 06.08.1981, *M.Küçüköyük* 83 (KNYA); Ilgın, Çavuşcu lake, 1024 m, 08.08.1992, *A.A.Dönmez* 2884 (HUB); Eskişehir: Sazak station, 728 m, edge of Porsuk river, 27.07.1954, *R.Çetik* 282 (KNYA); B4 Ankara: Çubuk dam, 21.07.1960, *R.Çetik* 763 (ANK); beside Ankara stream, around Ayaş bridge, 02.07.1970, *M.Kılınç&T.Uslu* 321 (ANK); İncesu, river banks, 09.10.1946, *H.Bağda* (ANK); - Ayaş, Sinanlı, Karakoyunlu, around Ankara stream, 700 m, 25.08.1987, *Ş.Yıldırım* 9708 (HUB); B5 Kayseri: Sultan Sazlığı, Yahyalı, Ovaçiftliği village, Eğrigöl Adası, 1071 m, 06.08.1994, marshy ground, *M.Öztekin* 1754 (HUB); B6 K.maraş: Göksun, Kumlupınar, 1300 m, 27.10.1980, field, *B.Yıldız* 2396 (HUB); Malatya: Doğanşehir-Dedeyazı, Keşiş D., ca. 2100 m, 28.07.1971, *H.Peşmen* (EGE 11865); B8 Erzincan: N of Fırat, marshy ground, *H.Bağda* 500 (ANK); Mercan-Erzincan, Karasu, 31.07.2006, 1386 m, river banks, *E.Uzunhisarcıklı* 2213 (GAZI); Saztepe, 31.07.2006, 1185 m, *E.Uzunhisarcıklı* 2214 (GAZI); B9 Kars: Aralık, Ortaköy, Dipsiz lake, c. 850 m, 02.09.1980, *O.Güneş* 17649 (HUB); C2 Muğla: Fethiye, *P.H.Davis* 13644 (ANK); Köyceğiz, Kavakarası village, Kaşıkçı, 20 m, 22.05.1991, field, *A.Güner* 9220, *M.Vural&H.Şağban* (HUB); Köyceğiz-Hamitköy, 20 m, 26.07.1992, wetland meadows, *A.Güner* 10763 (HUB); C3 Burdur: Bucak, near the Ketsel Sağlık Ocağı, 900-1000 m, 25.08.2005, river banks, *E.Uzunhisarcıklı* 2122 (GAZI); Antalya: Kemer, Faselis, 30 m, 30.07.1980, serpentine slopes, *H.Peşmen* 4925 (HUB); C4 Konya: Aslım Çorağı, 1000

m, 01.08.1966, *E.Yurdakulol* 619 (ANK); Seydişehir, edge of Suğla lake, 1100 m, 21.07.1980, *H.Ocakverdi* 793 (ANK, KNYA); Bozkır, Suğla lake, 05.08.1967, marshy ground, *R.Çetik* 6857 (KNYA); C9 Hakkari: N of 10 mil Dezi, Zap gorge, river banks, 1500 m, 17.08.1954, marshy ground, *P.H.Davis-N.V.Polunin* 24516 (ANK, BM).

Distribution: Turkey, Europe, Palestine, Caucasia, Syria, Iran, Afghanistan. Widespread.

Althaea officinalis, has been classified in LC (IUCN, 2010), as a widespread element even at high altitudes (2000 m).

4. *Althaea hirsuta* L., Sp. Pl. 687 (1753). Ic: Bonnier, Fl. Comp. Fr., Suisse et Belge 2: t. 98 (1912). (Figure. 22.)

Type: Described from France, Italy, and Spain (photo. Hb. Linn. 868/3!).

Annual, plant 4-70 cm, erect or ascending, simple or branched at the base. Stem 1-5 mm diam., cylindrical. Plant wholly hispid-hirsute hairy. Basal leaves palmatilobate, 0.5-1.8 × 0.4-2.5 cm, cordate-orbicular, cordate at the base, margin crenate, apex obtuse; slightly or deeply 3-5-lobed, lobes 0.2-1 × 0.3-1.2 cm, oblanceolate. Petiole 0.3-7 cm. Stipules simple, 1.5-5 mm, lanceolate-elliptic, margin entire, apex acuminate. Cauline leaves palmatilobate, palmatifid-palmatisect, 0.7-3 × 0.8-4.5 cm, cordate-orbicular, cordate at the base, margin crenate or slightly serrate, apex obtuse, acuminate; slightly or deeply 3-6-lobed, lobes 0.3-3 × 0.2-1.5 cm, oblanceolate. Petiole 0.2-8 cm. Stipules simple, 1-9 mm, lanceolate, margin entire, apex acuminate. Floral leaves palmatifid-palmatisect, 0.7-2.5 × 0.8-4 cm, cordate-orbicular, truncate, cordate at the base, margin crenate-serrate, apex acute; 3-5-lobed, lobes 3-12 × 1-13 mm, mostly the middle lobe larger than others, oblanceolate or elliptic. Petiole 0.2-1.5 cm. Stipules simple, 2-10 mm, lanceolate, margin entire, apex acuminate. Flowers solitary in the leaf axils. Pedicels 0.5-7 cm. Epicalyx 7-8, connate at the base; lobes 4-13 × 1-4 mm, lanceolate, margin entire, apex acuminate. Epicalyx more than ½ as long as calyx or ± ½ as long as calyx. Sepals 5, connate at the base, 5-15 × 1-3 mm, linear-lanceolate, margin entire, apex acuminate. Petals 5, pinkish-lilac, 6-16 × 5-10 mm, margin entire, apex

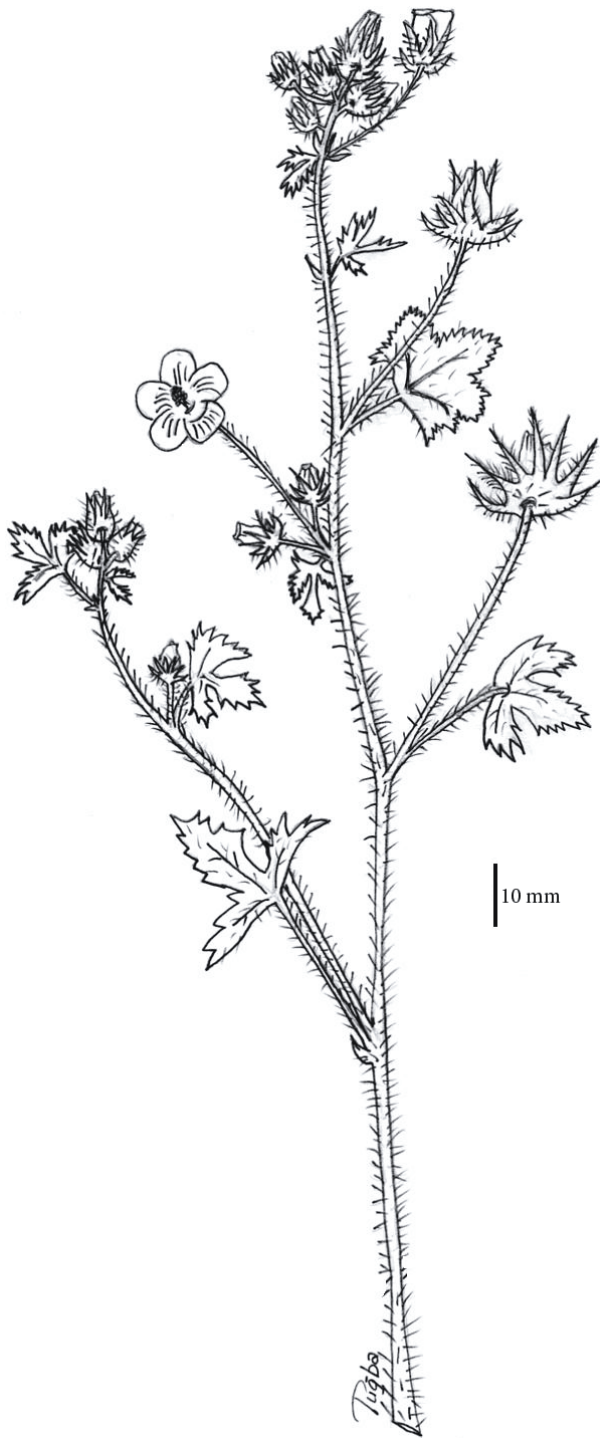


Figure 22. Habitus of *Althaea hirsuta*.

entire or retuse, white pilose hairy at the connate part. Stamens numerous, anthers reniform, purple; filaments dorsifixed, pilose, glandular hairy. Staminal

tube cylindrical, 0.5-1 mm, glabrous or sparsely glandular. Stylus divided toward the apex. Mericarps 1-1.5 × 2-2.5 mm, reniform, wingless, slightly rugose, brown, glabrous. Seeds 1-1.3 × 0.7-1.4 mm, reniform, brown, glabrous.

Fl. 5-6, Fr. 6-8, Habitat: roadsides, meadows, rocky slopes, maquis, open area of *Quercus*. s.l.-1700 m.

Examined specimens: Turkey, A1 Kırklareli: Soğucak, 28.05.1973, A.Baytop & E.Tuzlacı 25151 (HUB); Çanakkale: Sarıyer, 31.05.1883, P.E.E.Sint. 895 (BM); Bolayır-Gelibolu, 10 km to Gelibolu, 20.05.1975, N.&E.Özhatay s.n. (ISTE 31696); Gelibolu-Eceabat, 20 km to Eceabat, 26.05.1975, G.Ertem s.n. (ISTE 25072); Edirne: Keşan-İpsala, 25.05.1973, G.Ertem s.n. (ISTE 25024); Tekirdağ: Yeniköy-Uçmakedere, Ayvazdere, 17.07.1974, N.&E. Özhatay s.n. (ISTE 28426); Şarköy, 5 km from Gölcük, 300 m, 05.06.2007, open area of *Quercus* sp., E.Uzunhisarcıklı 2227 (GAZI); Balıkesir: Marmara Adası, 100 m, 09.05.1978, E.Tuzlacı s.n. (ISTE 29317); A4 Kastamonu: Pınarbaşı, Kaval-Nalbantoğlu, 900 m, 25.06.2003, roadside, E.Uzunhisarcıklı 1923 (GAZI); ibid., U.Özbek 1558 (GAZI); Azdavay, 600 m, 20.06.1978, O.Ketenoglu 1356 (ANK); Tosya, Sapaca village, 570 m, 06.06.2007, roadside, E.Uzunhisarcıklı 2230 (GAZI); Zonguldak: Karabük, Keltepe, around Karaağaç village, 1100 m, 17.07.1985, M.Demirörs 1706 (ANK); A5 Çorum: Kargı, Köse D., Kavakçay plateau, 1300 m, 13.07.1977, M.Kılınç 6883 (ANK); Yozgat: 14 miles from Çekerek to Alaca, 900 m, 27.05.1965, wheat field adjacent to dry marshy ground, M.J.E.Coode & A.P.D.Jones 1633 (ISTF); B1 İzmir: Bornova-Bayraklı, 22.04.1962, C.Regel s.n. (EGE 11563) İzmir, 03.05.1854, E.K.Balls 385 (BM); B2 Manisa: Soma, Kömür İşletmesi, Daniş village, meadows, 460 m, 15.05.1977, Ö.Seçmen 1048 (ANK, EGE 23645); Kütahya: Eskişehir-Kütahya, 40 km to Kütahya, 930 m, 06.06.1973, fields, A.Baytop & E.Tuzlacı s.n. (ISTE 25353); Denizli: Çivril, Işıklı, around Beydilli-Homa, c. 900 m, 06.06.1983, Y.Gemici 2092-a (EGE); B3 Bilecik: Bozüyük-Eskişehir, 19 km E of Bozüyük, 890 m, 07.06.1975, R.Çetık 3620 (ANK); Bozüyük-İnönü, 8 km from Akpınar, 06.06.1973, fields, A.Baytop & E.Tuzlacı s.n. (ISTE 25337); Mekece-Osmaneli, 7 km to Osmaneli, 21.05.1966, A.Baytop, B.Çubukçu (ISTE 9289); B6 Kayseri: 10.05.1935, E.K.Balls 2254 (ANK); C1

Aydın: Bafa lake, 21.04.1968, *C.A.Meyer&H.Peşmen s.n.* (EGE 5636); Söke-Kuşadası, 10 km to Kuşadası, 100 m, 03.05.2007, maquis, *E.Uzunhisarcıklı* 2217 (GAZI); C3 Antalya: Finike, 100 m, 13.05.1976, *Calicotome villosa* maquis, *R.Çetik* 5159 (KNYA); Yeniköy-Kırkgöz, 410 m, 14.06.1978, rocky slopes, *R.Çetik* 6201 (KNYA); Çubuk Boğazı, 22.05.1950, *A.Heilbronn&A.Attila s.n.* (ISTF 9690); Gökliman, 29.05.1950, *A.Heilbronn&A.Attila s.n.* (ISTF 10099); C2 Denizli: Honaz D., Çukurköy plantation area, 750 m, 21.05.1973, *E.Tuzlacı s.n.* (ISTE 24970); C4 Konya: Seydişehir-Maden, Ateş Yokuşu, 1600 m, 02.07.1980, roadside, *H.Ocakverdi*, 795 (ANK, KNYA); Ermenek, Kazancı, Çökek, 1000 m, 11.04.1984, *H.Sümbül* 2808 (HUB); Mersin: Mut, Kadı village, 280 m, 06.04.1979, *M.Vural* 158 (ANK); Silifke, Taşucu, 22.04.1984, *N.Şeren* 1002 (HUB); C5 Mersin: Tarsus-Limonlu, Sandal D., 05.05.1971, maquis, *T.Uslu* 226 (ANK); Mersin-Tarsus, alt. 3 m, weed in lush bean field, 07.04.1954, *P.H.Davis* 26543 (BM); C6 Hatay: İskenderun, Amanos D., 1200 m, 08.05.1968, *Y.Akman* 2461 (ANK); Belen, 16.05.1962, *A.Baytop&T.Baytop s.n.* (ISTE 7032)

Distribution: Turkey, Europe, NW African, SW Asia. Widespread.

Althaea hirsuta can be easily distinguished from other species by its annual, short, and slender habitus and hirsute hairs on all parts of plant. This species is distributed in W, S, and Central Anatolia. It has been recommended to be placed in the LC category (IUCN, 2010).

Discussion

Eighteen species of *Alcea* are recorded in the *Flora of Turkey* (Cullen, 1967). As a result of the present study, the number of species that belong to *Alcea* has been changed to 17; *Alcea lavateriflora* has been considered a doubtful record. *Althaea* is represented by 4 species (Cullen, 1967). The number of species belonging to this genus is still 4.

Based on the *Flora of Turkey*, 7 species of *Alcea* phytogeographically are Irano-Turanian elements, while one of them is Mediterranean. In contrast to

this genus, no certain region was specified for *Althaea* (Cullen, 1967).

According to a comprehensive study on *Alcea* by Zohary (1963), regarding phytogeographical regions, the centre of origin of this genus is Anatolia. *Althaea* is represented within the Mediterranean and Irano-Turanian regions. Therefore, Anatolia may also be suggested as the centre of origin for this genus.

Alcea rosea as a cultural species shows a wide range of variety in morphological characters (tall stem, hairy or hairless, leaves distinctly large with different kinds of division, various coloured petals, distinctly large mericarps).

In this study, diagnostic characters between species that morphologically seem close and the threat categories of examined species according to IUCN 2010 are discussed.

Alcea apterocarpa, *Alcea calvertii*, *Alcea fasciculiflora*, and *Alcea pisidica* were cited as endemic species. However, based on recent studies, *Alcea apterocarpa*, *Alcea calvertii*, and *Alcea fasciculiflora* have been reported in neighbouring countries. Therefore, these 3 species are not regarded as endemic to Turkey.

In addition, *Alcea lenkoranica* Iljin (Kars province) and *Alcea peduncularis* Boiss. (Erzincan-Kemaliye region) were recorded as doubtful taxa (Cullen, 1967). However, the examination of new collections from these localities has indicated that the specimens belong to *Alcea hohenackeri* and *Alcea excubita*, respectively.

Acknowledgements

We thank all the curators of herbaria that we visited for their kind permission to work, Seçil Güngör and Tuğba Açıkgöz for the illustrations, and Dr Murat Ekici, Dr Faik Karavelioğulları, and Dr Ufuk Özbek for their kind efforts during our fieldwork. The Scientific and Technological Research Council of Turkey (TÜBİTAK) is thanked for its financial support (Project No: TBAG- 2282).

References

- Alefeld F (1862). Ueber die *Malveen*. *Oesterreichische Botanische Zeitschrift* 12: 246-255.
- Amadei L, Giordani A & Tomei PE (1983). Numeri cromosomici per la Flora Italiana. *Informatore Botanico Italiano* 15: 39-43
- Aytaç Z, Karavelioğulları FA & Ekici M (2005). Yok olan tür (EX) ve yetersiz veri (DD) basamağında bulunan bazı taksonlar ile ilgili veriler. *Ot Sistematik Botanik Dergisi* 12(1): 9-20 (in Turkish).
- Azaizeh H, Saad B, Khalil K & Said O (2007). The state of the art of traditional Arab herbal medicine in the eastern region of the Mediterranean: a review. *Evidence-Based Complementary and Alternative Medicine* 3: 229-235.
- Baker EG (1890). Synopsis of genera and species of *Malveae*. *Journal of Botany* 28: 140-145, 207- 209.
- Boissier E (1867). *Flora Orientalis*. Genova et Basileae.
- Brummitt RK & Powell CE (1992). *Authors of Plant Names*. Kew: Royal Botanic Gardens.
- Cabi E, Başer B, Uzunhisarcıklı ME & Yavru A (2009). Pollen morphology of *Alcea* L. and *Althaea* L. genera (Malvaceae) in Turkey. *Feddes Repertorium* 120: 405-418.
- Cavanilles PAJ (1786). *Monadelphiae Classis Dissertationes Decem II*. Cum Approbatione et Privilegio Regiae Scientiarum Academiae Parisiis.
- Chariat-Panahi MS, Lessani H & Cartier D (1982). Etude caryologique de quelques espèces de la flore de l'Iran. *Revue de cytologie et de biologie vegetales - le botaniste* 5: 189-197.
- Cullen J (1967). *Alcea* L. and *Althaea* L. In: Davis PH (ed.), *Flora of Turkey and the East Aegean Islands*, vol. 2, pp. 411-420, Edinburgh: Edinburgh University Press.
- Davis PH & Hedge IC (1975). The Flora of Turkey; past, present and future. *Candollea* 30: 331-351.
- Dobea C & Hahn B (1997). IOPB chromosome data 11. *International Organization of Plant Biosystematists Newsletter* (Oslo) 26/27: 15-18.
- Ekim T, Koyuncu M, Vural M, Duman H, Aytaç Z & Adıgüzel N (2000). *Türkiye Bitkileri Kırmızı Kitabı*. Ankara: Türkiye Tabiatını Koruma Derneği ve Yüzüncüyıl Üniversitesi (in Turkish).
- Heywood VH, Tutin TG, Burges NA, Moore DM, Valentine DH, Walters SM & Webb DA (1968). *Flora Europaea*. Cambridge: Cambridge University Press.
- Heywood VH (1978). *Flowering Plants of the World*. London: Oxford University Press.
- Hutchinson J (1964). *The Genera of Flowering Plants (Angiospermae) Dicotyledones*. Oxford: Oxford University Press.
- Hutchinson J (1973). *The Families of Flowering Plants (Angiospermae) Dicotyledones*. Oxford: Oxford University Press.
- Iljin MM (1949). *Flora URSS*. Mosqua-Leningrad.
- IUCN Species Survival Commission (2010). *IUCN Red List Categories: Version 8.1*. Gland, Switzerland.
- Linne C (1753). *Species Plantarum*. Holmiae.
- Markova M (1982). In IOPB chromosome number reports 77. *Taxon* 31: 761.
- Markova ML (1989). Chromosome numbers of Bulgarian angiosperms. *Fitologija* 36: 67-68.
- Markova ML & Goranova VY (1993). Karyological study of representatives of family Malvaceae in Bulgaria. *Fitologija* 46: 12-32.
- Murín A (1993). Karyologické atúdium okrasn@3ych rastlín flóry Slovenska. *Biologia* (Bratislava) 48: 441-445.
- Nasir E & Ali SI (1979). *Flora of West Pakistan*. Karachi: Department of Botany, University of Karachi.
- Parmaksız İ & Özcan S (2011). Morphological, chemical, and molecular analyses of Turkish *Papaver* accessions (Sect. *Oxytona*). *Turkish Journal of Botany* 35: 1-16.
- Riedl I (1969). *Alcea* L. and *Althaea* L., In: Rechinger KH (ed.) *Flora Iranica*, vol. 12, pp. 37-86, Graz: Akademische Druck-u Verlagsantalt.
- Rouhi H & Ganji F (2007). Effect of *Althaea officinalis* on cough associated with ACE inhibitors. *Pakistan Journal of Nutrition* 6: 256-258.
- Strid A & Franzen R (1981). In Chromosome number reports LXXIII. *Taxon* 30: 829-842.
- Tekşen M & Aytaç Z (2011). The revision of the genus *Fritillaria* L. (Liliaceae) in the Mediterranean region (Turkey). *Turkish Journal of Botany* 35: 447-478.
- Townsend CC & Guest E (1974). *Flora of Iraq*. Iraq: Published by the Ministry of Agriculture and Agrarian Reform.
- Vachova M & Majovsky J (1980). In Chromosome number reports 69. *Taxon* 29: 720-721.
- Willdenow CL (1800). *Species Plantarum*. Berolini.
- Yücel E & Tülükoğlu A (2000). Gediz (Kütahya) Çevresinde Halk İlacı Olarak Kullanılan Bitkiler. *Ekoloji Çevre Dergisi* 9(36): 12-14 (in Turkish).
- Zohary M (1963). Taxonomical Studies in *Alcea* L. of South-Western Asia Part I. *The Bulletin of the Research Council of Israel* 11: 210-229.
- Zohary M (1963). Taxonomical Studies in *Alcea* L. of South-Western Asia Part II. *Israel Journal of Botany* 12: 1-26.